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FOUNDED 1903

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JUN 2 5 1956

**Complete Program Section** 



**Cost Factors Governing Buff Selection** Savings Possible by Consideration of **Buffing Expenses** 

Ventilation **Economics, Design and Application** 

Finishing Pointers Shunting of an Ammeter

Surface Treatment and Finishing of Light Metals **Hard Anodizing** 

Science for Electroplaters **Electrical Power** 

Complete Contents Page 73



FINISHING PUBLICATIONS, INC.

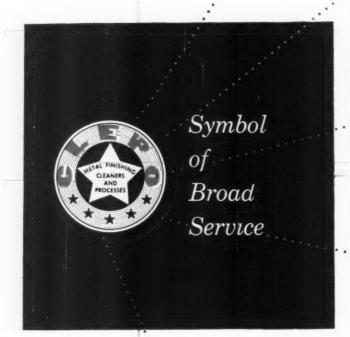
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- Cleaners
- Deburring Compounds
- Burnishing Compounds
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   Preparation
   Treatments
- Pickling Compounds
- Paint Adhering Phosphor Treatment for Steel Surfaces
- Strippers



Here, service is stressed more than products, important as these may be. With so many different formulations, each best for certain requirements, a competent field service man can save you time and money in first analyzing your metal preparation problems and then recommending the most effective and economical CLEPO formulations to solve them.

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CLEPO Field Man and Products have been serving your industry well for nearly twenty-five years.

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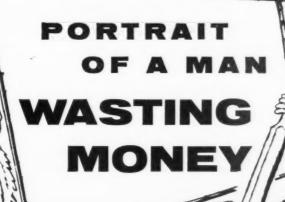
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NEW OAKITE CLEANERS

GIVE YOU MORE FOR YOUR

PAINT-PREPARATION DOLLAR

De. 6. 5 150

# Here are

# 6 ways to end pre-paint metal-cleaning troubles

	p- o p-				3 0 0 0							
Does	your trouble chart show	that you need bett	er cle	aners, strippers or s	surface conditioners?							
	Cleaning solution foams ex washing machine. See 1 belo			Zinc phosphating pr trol – requires too r additions, etc. See 4.	rocess too difficult to con- nany titrations, too many							
	Streaky discolorations or pow to surface of steel parts be repainting. See 2.			,	rocess doesn't show good ests. See 5.							
	Aluminum parts are severely stripped of zinc chromate p ishes. See 3.			tralizing, etcare no	s—cleaning, pickling, neu- eded to prepare steel that osphating before painting.							
Here	e are brief descriptions of	new Oakite mater	ials d	lesigned to end thes	se particular troubles:							
1.	For a spray washing solutio Does not attack aluminum.	n that does not foar	n at h	igh pressure, try Oaki	te Composition No. 161.							
2.	For stripping pigmented paint, phosphate coatings and undercoat rust in one operation, try Oakite Rustripper.											
3.	For safe, thorough stripping of aluminum, try Oakite Stripper No. 110.											
4.	For a zinc phosphating process that is truly easy to control, try new Oakite CrysCoat SW. No accelerators, starters or toners. Only one material used for make-up and up-keep.											
5.	For salt spray results far beyond the capacity of ordinary phosphating processes, try new Oakite CrysCoat No. 89.											
6.	For one-operation removal light soil together with good pound No. 131. Inhibited as	preparation for pair	nting,									
conta	E Check the coupon and we aining complete information are interested.				Now to apply iron phosphate coating to steel in preparation. For painting	L						
	i.	OAKITE PRODUC	TS, II	NC.	CRYSCOAT							
	SPECIALIZED INBUSTRIAL CERANING	18 Rector Street,	New'	fork 6, N.Y.								
OAKITE  Send me free booklets or bulletins giving complete information on the new Oakite materials checked below:												
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	3	□ Oa	kite R	ustripper	Oakite CrysCoat No. 89							
	ical Service Representatives in pal Cities of U. S. and Canada	□ Oa	kite S	ripper No. 110	Oakite Compound No. 13	31						
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B = 597554 ·

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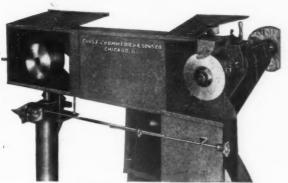
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OBLIQUE
TUMBLING BARREL

EXTRUDED COMPOSITIONS
STANDARD SIZE
2 x 2 x 10"



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BACKSTAND IDLER



#23A
POLISHING LATHE

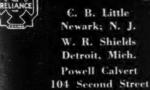


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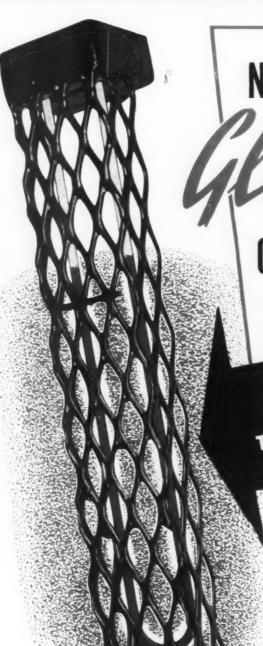
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6

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... anode bags ... single nickel
salts—nickel chloride ... nickel carbonate ... nickel fluoborate ...
boric acid.

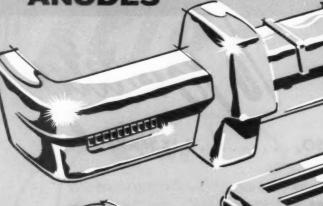
#### chromium plating

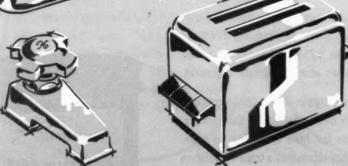
... pure "Krome Flake" 99.8% CrO<sub>3</sub> ... sulphates less than .10% ... lead, tin-lead and antimony-lead anodes.

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# CHEMICALS AND ANODES





### cadmium plating

. . . ball and cost cadmium anodes . . . cadmium oxide . . . sodium cyanide . . . cadmium fluoborate.

### tin plating

... cast tin anodes ... sodium stannate ... stannous sulfate ... tin fluoborate... acid tin addition agent.

#### zinc plating

... ball and cast zinc anodes ... sodium and zinc cyanide ... zinc sulfate ... zinc fluoborate.

### lead plating

... cast lead anodes ... lead fluoborate.

### silver plating

... silver cyanide.

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#### Cleveland 6, Ohlo

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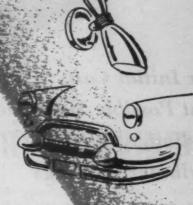
BETTER BRIGHTNESS with thinner deposits.

SIMPLE OPERATION and CONTROL

Plates brightly from 120°F to 155°F. pH can vary over a wide range. Liquid addition agents.

REMAINS DUCTILE AFTER LONG OPERATION

For additional information contact the Harshaw office nearest you.







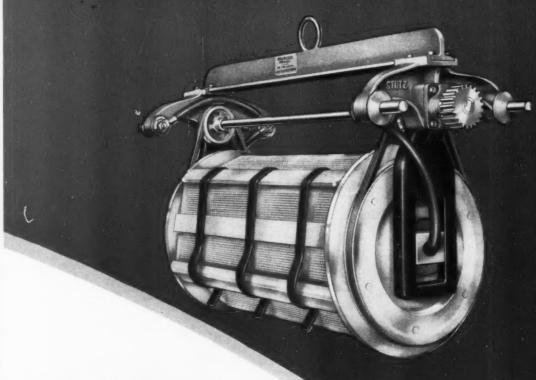
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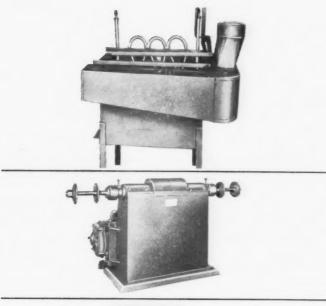
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Lower Initial Cost
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No Cylinder Gears
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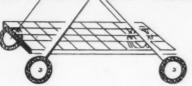
Stutz Belt Drive complete cycle Plating Barrel. This unit incorporates a cylinder of one piece Plexiglas construction, suspended and rotated by two V belts and arranged between cast steel guide frames protected with 5/16" thick special vulcanized hard rubber. For smooth barrel operation, saddle horns are located on 15" centers, 4 provided for maximum current. Cylinder door is heavily reinforced and is locked with vinyl chloride covered spring steel bung clamps. Cathode contactors are dangler type. These units made to fit most makes of plating tanks and furnished also with motor drives mounted directly on cylinder superstructure. Standard sizes 14"x30" and 14"x36" (I.D.) 12 additional sizes from 12"x24" to 18"x42" (I.D.). Standard perforations 3/32" round on 3/16" centers. Patented dual hole for processing of extremely small parts available.

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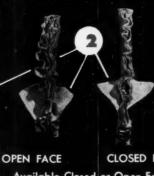
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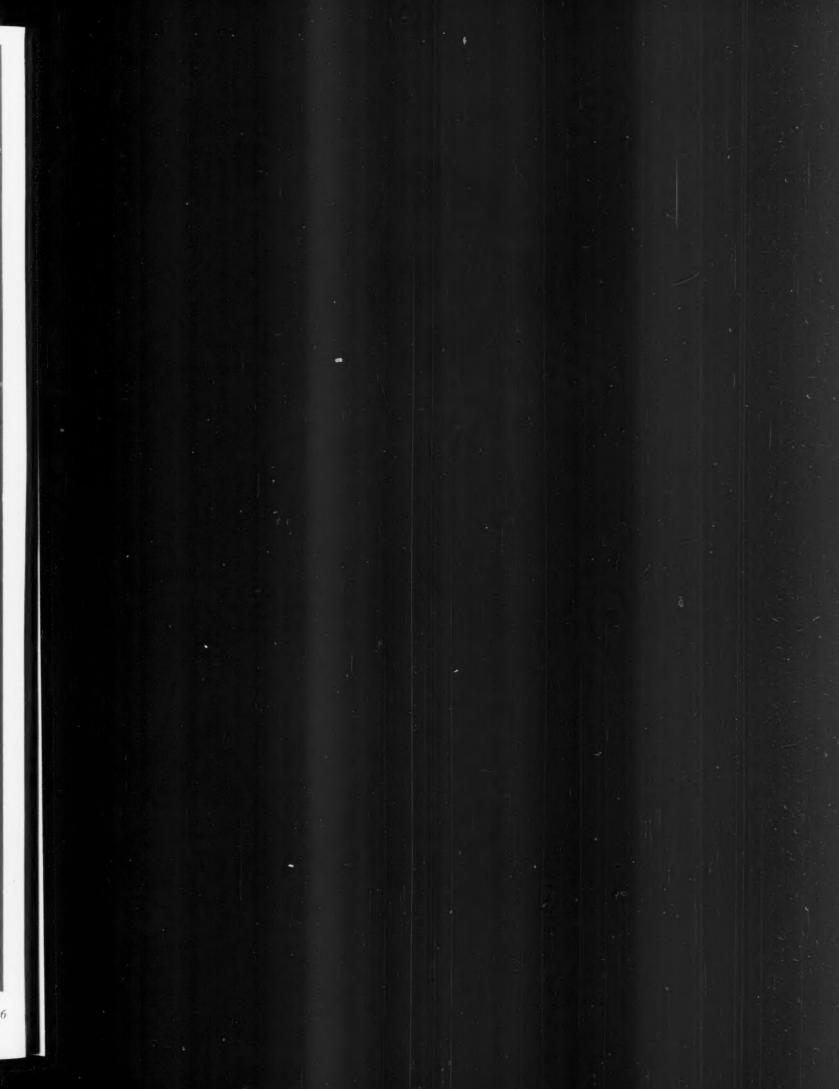
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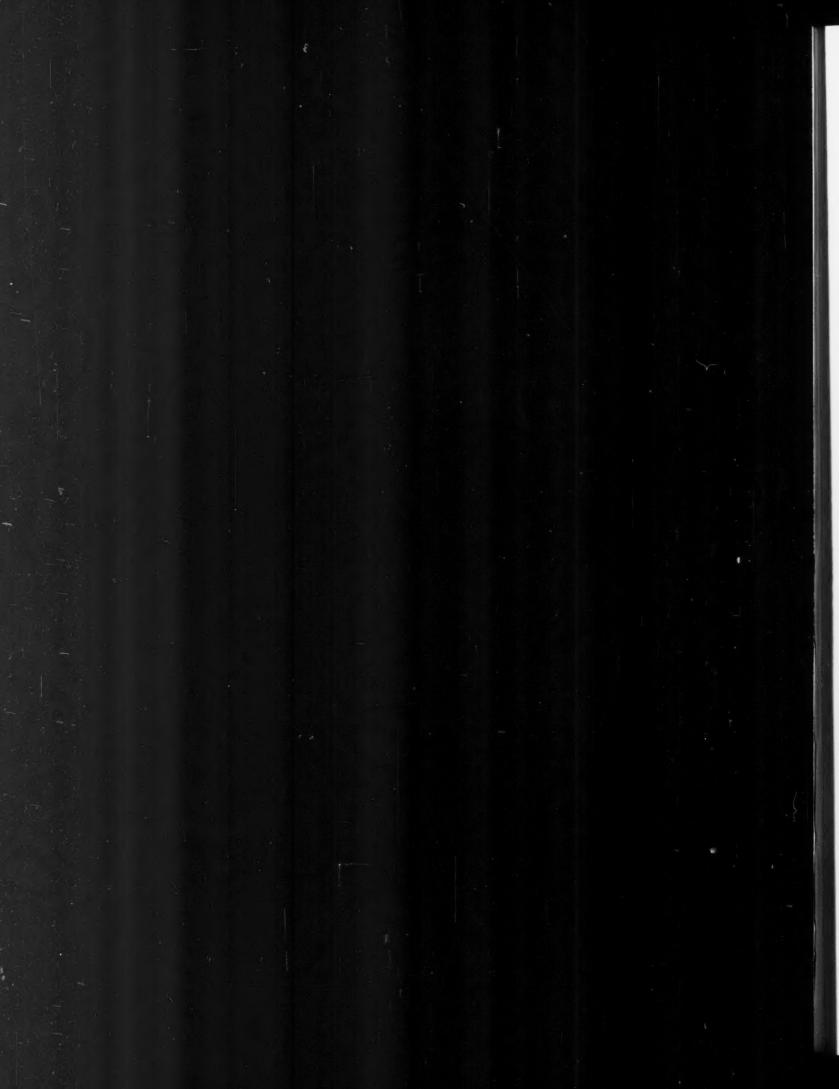


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THE Way 1803 CORPORATION

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Caustic soda flake direct from Dow . . . low cost, effective metal cleaning. These free-flowing, uniform flakes give users the very maximum in alkaline stripping power.

Full *supply* of this unmatched caustic flake is assured through Dow multi-plant production: Midland, Michigan; Freeport, Texas; Pittsburg,

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When a better stripping job at lowest cost can be yours for the asking . . . it's good sense to ask for Dow caustic flake. The Dow CHEMICAL COMPANY, Dept. AL 753J-1, Midland, Michigan.

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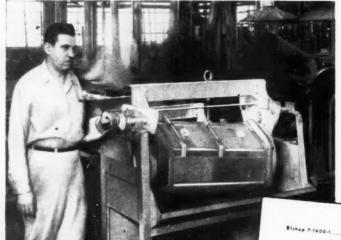
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SYSTEM . . . SINCE 1946





### "The New Belke Double Oscillating Cylinder



gives us

"more uniform distribution of plate according to quality control checks

"noticeable color improvement on brass plating

"20% increase in load sizes."

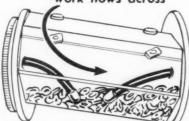
Says Paul Glab,

Superintendent of Plating, Northwestern Plating Works, Chicago.

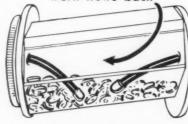
**Improved Quality Control and** increased production with lower cost are a cinch with this new BELKE Plating Cylinder.

The cylinder oscillates as it rotates

work flows across



work flows back



NORTHWESTERN PLATING WORKS

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March 23, 1956

Belke Manufacturing Co. 947 N. Cicero Avenue Chicago 51, Illinois

In reply to your inquiry, our Belke Double Oscillating Flating Barrel is giving much greater improvement in plating results than we had anticipated.

Quality control checks show plating thickness is much more uniformly distributed. The over plating of some parts and under plating of others, that occurs with conventional plating cylinders, is avoided.

The improvement is particularly helpful in plating washers and other flat parts which so often come through partially plated because the parts stick together.

We have used the double oscillating barrel on brass, zinc, and cadmium plating with equally good results. On color.

In addition, we have increased the load size 20% while turning out the best plating work we have ever

We consider the new Belke barrel an important asset to our operation and will be glad to show it to other

Very truly yours,

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Taul Slab

Paul Glab, Supt. of Flating

Ask your BELKE Service Engineer or write for literature.

all sides of all parts are equally exposed to plating current. No part of the load stays at the ends where little plating occurs. No parts stay buried with greatly reduced exposure to plating

Do you realize that this 20% saving in plating cost is all profit you are not getting now!



Manufacturing Company

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with the exclusive

# DUALOMATIC

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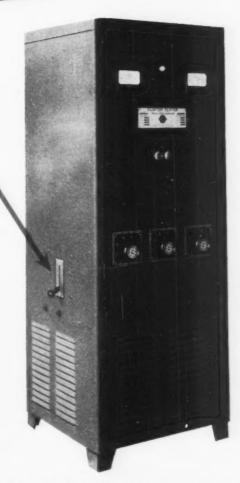
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RATED D.C. OUTPUT

Model	1512H02	{	1500	Amps.,	2-6/6-12	Volts	o \$1445	
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Model	4012H02	{	4000/	Amps.	2-6/6-12	Volts	o \$3485	PRICES F.O.B.
Model	5012H02	{	5000	Amps.	2.6/6.12	Volts	o \$4289	PRI
Model	6012H02	{	6000	Amps.	2-6/6-12	Volts	0 \$4989	
1	A.C. Input-	_	3 Phase, 60	Cycle,	220 Volts.			

All series of the Clinton Heavy Duty Platers come complete with built-in voltage regulators and all necessary operating accessories.

Dual-O-Matic 4-9/9-18 volt prices on request.



Liberal trade-in allowance on your old rectifiers, Other Dual-O-Matic models available in all amperes and voltage ratings. Technical data bulletin available on request.

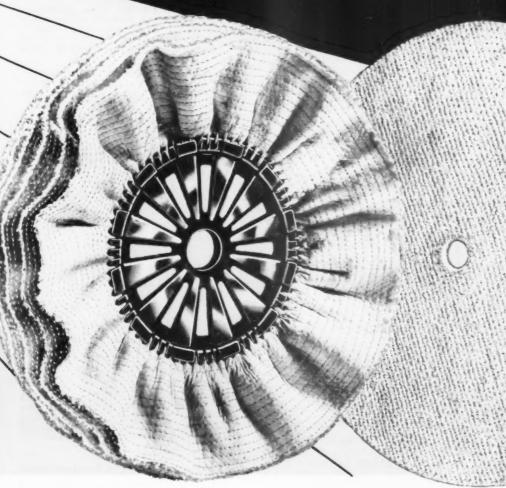
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Top-quality "Permanized" sisal, in a variety of constructions: All-Sisal for even finish; Sisal with Cloth for long wear; Sisal with Krinkle-Kraft Paper for extra-sharp cutting; and Custom-Treated Sisal, for harsh or soft cutting to meet your specific needs.

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### Successful barrel for plating chromium

Small parts are being quality plated easily, quickly and with great economy today in Unichrome 24-inch batch-type Chromium Plating Barrels. Batch plating permits time to be varied to control deposit thickness. The operator loads parts into the barrel, unloads from a tray minutes later. Work shows no contact marks. The whole unit occupies only 4x6 ft. floor space.

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Over 4 years' service experience with Unichrome Bright Nickel shows a consistent pattern of performance. The brighteners are stable and long-lived. Control problems are further simplified because the bath tolerates impurities so well. As for the bright deposits, they exhibit unusual receptivity for the subsequent chromium plate. Send for more information.

Unichrome is a trademark of Metal & Thermit Corp.



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Platers find they cut costs and improve plating quality, too, when ordinary chromium is replaced with Unichrome SRHS Chromium Solutions. Today's large scale acceptance of this leading process confirms that such benefits are obtained consistently.

#### EASIER OPERATION

One remarkable feature about SRHS Solutions is the self regulation of important chemical constituents. By maintaining themselves in peak plating balance, the baths give platers greater freedom from control problems and a more foolproof operation.

#### DOUBLE THE SPEED

Using SRHS Chromium, plants have been plating up to twice as fast as with ordinary chromium. Power consumption frequently drops, too, due to higher cathode To maintain the SRHS Bath, an easy, solution-density reading is taken. When the readings indicate need for solution maintenance, simply adding a single SRHS material as at left will bring solution back to optimum plating balance and keep it there.

Self-regulated, SRHS" maintains its wide bright plating range and assures quality deposits. Note how on this part the plate misses no areas yet burns no projections.



efficiency. Many a hard-pressed plant has gained more production capacity without extra equipment merely by switching to SRHS Chromium.

#### QUALITY DEPOSITS

Unichrome SRHS Solutions have wider bright plate range. They thereby reduce burning and missing . . . major causes of rejects.

These time-confirmed improvements are worth full investigation by any plater still working with ordinary chromium. Send in for details. From jet engine blades...

to shoehorns...

for fast, economical finishing...

SIMONDS ABRASIVE CO.

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IACONY AND FRALEY STREETS PHILADELPHIA 17, PENNSYLVANIA

There's virtually no limit to the wide variety of parts, materials and shapes that can be finished *in quantity* by the tumbling method . . . using Borolon abrasive.

Each abrasive particle is a dense, solid mass of tough, fused crystalline aluminum oxide . . . fast cutting and resistant to acids and alkalies. Furnished in lumps (#00 to #3) and all screened sizes. Used in all types of tumbling and precision barrel finishing equipment.

Get this FREE sample and inspection kit of Barolon Tumbling Lumps and descriptive catalog bulletin. Send us your sample part for experimental processing and recommended procedures.

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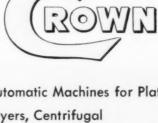


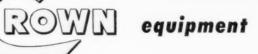












Automatic Machines for Plating-Anodizing, etc.

Dryers, Centrifugal

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**Plating Barrels** 

Rectifiers

Rheostats, Switches — Controls

Tray — Transfer Type Cleaning — Rinsing — **Dipping Units** 

Tumbling Barrels — "Horizontal" — "Tilting"

Special equipment designed and built

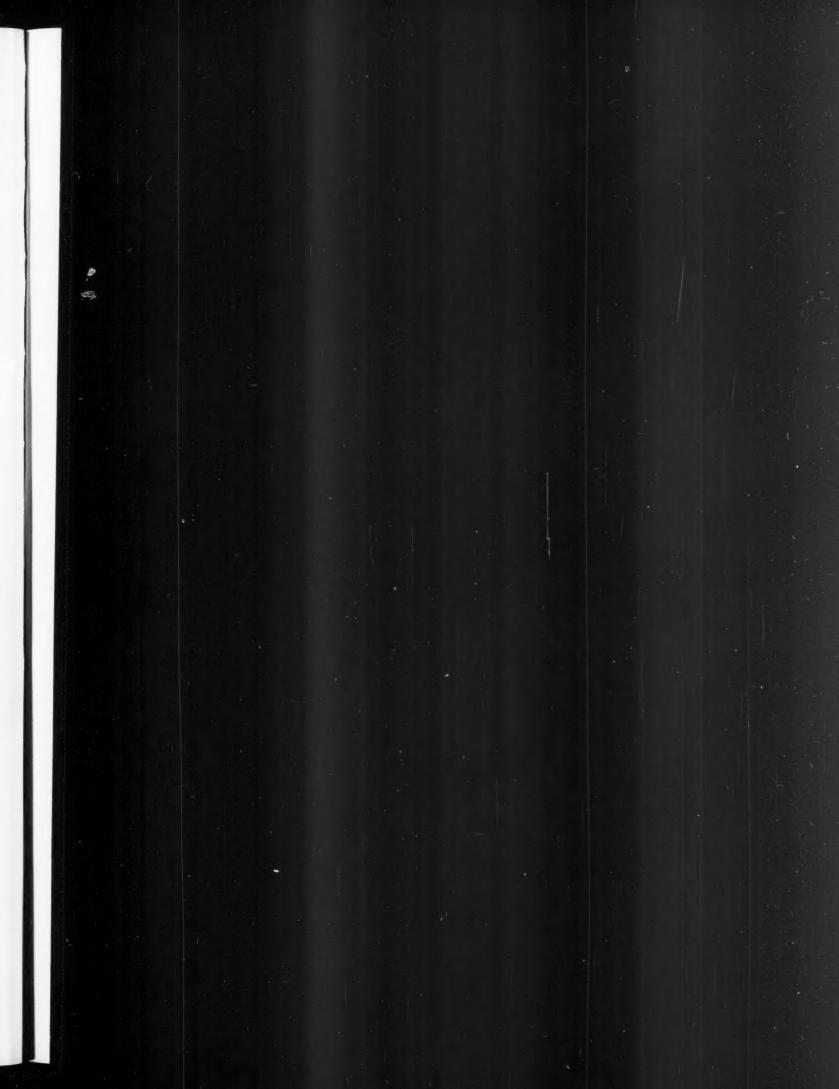


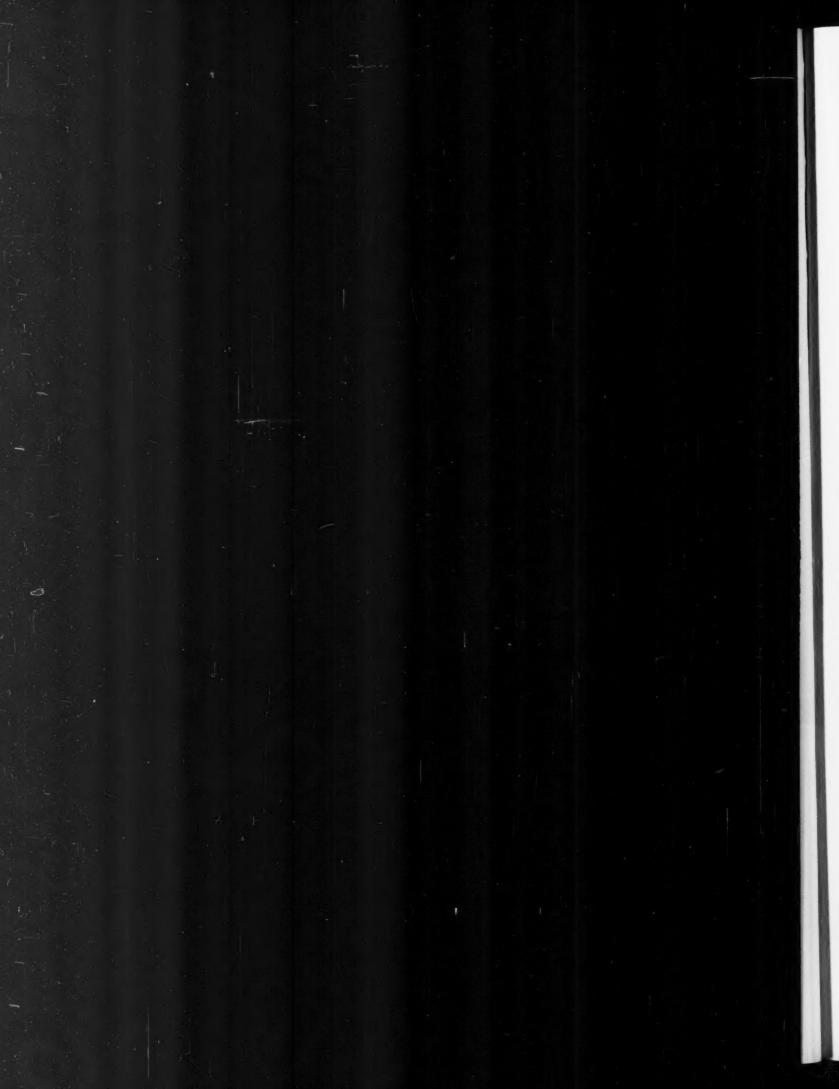




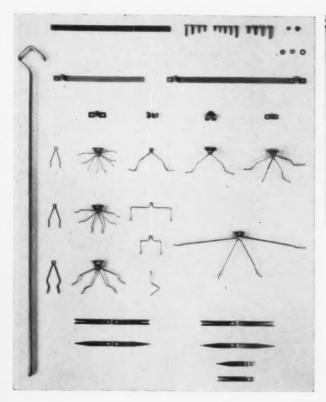
COMPLETE DETAILS SENT PROMPTLY ON REQUEST

CROWN COMPANY





## DO IT YOURSELF!





"Stand-It-All" Rack Patch does the complete patching job on your insulated plating racks. One or two coats are ample and it is air dry.

# with Standard's ERECT-A-RACK

Now you can make up your racks exactly as you need them, when you need them, at the lowest possible cost. You can cut rack preparation time to a fraction for those emergency jobs—using pre-formed parts.

No bulky equipment needed for bending and forming—you need only a screw-driver and wrench. Simple and fast assembly gives you almost any possible combination of rack contacts and arrangements.

You can have the necessary parts for any rack you're likely to need, right in your own stock. A full range of standard parts is available—all you do is clamp the desired contacts on a spine, slide them along to get the desired spacing, and tighten.

No holes to drill-no "not quite right" racks-no big equipment needed-no high cost.

With ERECT-A-RACK you can make up common or really "special" racks—any number of combinations are possible. A few common arrangements are shown.

It's a must for patching after making a tip replacement..

> Injured Areas Are Mended to Perfection With Just a Squeeze of the Tube . .

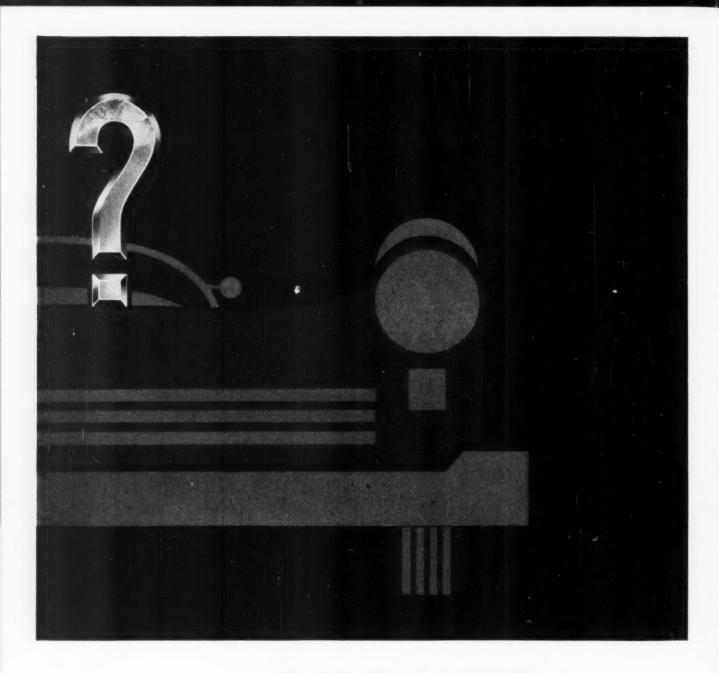
### STANDARD

PLATING RACK COMPANY

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A STANDARD PRODUCT OF THE "WORLD'S LARGEST PLATING RACK MANUFACTURERS"



# Grill Diamond's service department on chrome plating

Call in DIAMOND technical specialists when you run into a chrome-plating problem. These experienced men work only on customers' questions. They deliver complete, profit-making answers. Their service is free.

In making chromic acid, DIAMOND controls quality through every step. DIAMOND experience begins with importing the chrome ore and making the soda ash. It includes production and delivery ... even standing by your side, if you wish, to help you get top-quality plating results at low cost.

DIAMOND facilities—two chromic acid plants and nine warehouses and sales offices across the country—assure you uninterrupted service from a dependable source of supply. DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.



## CHECK THESE PRICES

### for General Electric Air-cooled Germanium Platers

6 volts, 1500 amps . . \$1565.00

12 volts, 1000 amps . . \$1616.00

12 volts, 2000 amps . . \$2465.00

**NOW EVERY PLATING SHOP** can take advantage of the long life and operating savings of germanium with:

- 1 THE UNIQUE G-E TRUE HERMETICALLY SEALED GER-MANIUM CELL—that safeguards the germanium from corrosive atmosphere.
- 2 THE UNIQUE G-E GERMANIUM PROTECTIVE SYSTEM—
  the first protective device designed specially to help
  safeguard the germanium cell against all types of overloads. Provides an original advance-warning feature to
  help prevent costly, sudden shutdowns.
- 3 GENERAL ELECTRIC EXPERIENCE IN GERMANIUM—over 13,000 kilowatts (2,000,000 amperes at plating voltages) of germanium rectifiers installed and operating. General Electric Co., Schenectady 5, N. Y.





Prices refer to integral tap switch unit shown here.

### CALL YOUR AUTHORIZED GENERAL ELECTRIC PLATING AGENT TODAY.

M. E. BAKER CO., Cambridge, Mass.
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GENERAL ELECTRIC SUPPLY CO., Cleveland, Ohio FRED GUMM CHEMICAL CO., Kearny, N. J.

FRED GUMM CHEMICAL CO., Kearny, N. J. LASALCO, INC., St. Louis, Mo.

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MEAKER CO., Cicero, III.
GEORGE L. NANKERVIS CO., Detroit, Mich.
THE REYNOLDS CO., Philadelphia, Pa.

STANDARD PROCESS CORP., Chicago, III.
UDYLITE, Detroit, Mich.
S. A. DAY, Buffalo, N. Y.

METAL FINISHING, June, 1956

# SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

### NUMBER I—Decorative, Corrosion-Resistant Finishing with Iridite

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a decorative finish or a good paint base for non-ferrous metals. However, continued developments are so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can combine salable appearance with durability in one finish at a competitive price advantage. Report II on paint base, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, as a basis for this discussion, a "decorative" finish is considered as any chromate film that is used as a final finish in itself. It may be truly decorative in that its sole purpose is to enhance the beauty of the product. For example, a bright chrome-like finish or a pleasing bronze appearance are among the many effects that can be obtained. It may be functionally decorative in that it reduces reflectivity for camouflage purposes or provides a means of color-coding parts. But, in all cases, the Iridite films protect the metal against corrosive attack.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. These films can produce a wide variety of pleasing appearances. The basic colors of the Iridite coatings are grouped below by metals.

ZINC and CADMIUM: Metallic bright, light iridescent, iridescent yellow, bronze, olive drab.

COPPER, BRASS, BRONZE: Metallic bright, yellow.

ALUMINUM ALLOYS: Clear, iridescent yellow, brown.

MAGNESIUM ALLOYS: Metallic bright, iridescent yellow-red, brown.

SILVER: Metallic bright.

In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

Depending upon the metal and the Iridite used, corrosion resistance of clear and bright films ranges from mild passivity to as high as 500 hours in salt-spray; on heavier dark films, salt-spray resistance ranges from approximately 100 to 1000 hours.

It is this combination of decorative and corrosion resistant properties that accounts for the widening use of Iridite finishes. For example, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, a combination of lustrous chemical polishing of the as-cast surface of zinc die castings and good resistance to corrosion. Further, in many cases,

### WHAT IS IRIDITE?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

sizeable savings in the cost of buffing and electroplating are realized.

On many steel parts, a simple system of zinc or cadmium plate and bright Iridite is used instead of more costly electroplated finishes to provide a bright, decorative and protective finish with tremendous savings in material, equipment and labor.

In finishing aluminum, where corrosion resistance or paint adherence is the prime consideration, the aircraft industry has all but abandoned the anodizing process in favor of recently developed chromate conversion coatings, among them Iridite #14 and #14-2 (Al-Coat). These formulations and their method of application can be varied to retain the original metallic appearance while providing acceptable corrosion resistance, or to produce a fully colored brown finish that offers exceptional corrosion protection. Again, time and manpower savings are astounding—one company saved at least \$15,000 a year on maintenance of racks alone and another \$40,000 on materials and labor in only nine months. In addition, of course, hundreds of thousands of dollars are saved by eliminating the need for expenditures for generators, heating equipment and racks.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to having decorative and protective functions, these chromate coatings form an excellent base for organic finishes and bonding compounds. They have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 E. Monument Street, Baltimore 5, Maryland.

"Why accept imitations when the original costs no more!" JOE-D It took specialized "know-how" to conceive

and create the first patented Bias Sisal Buff! And that same knowledge has been steadily enlarged and improved by the ablest, most experienced staff in the business-concentrating on this type of buff. Today, our modern, efficient plant proudly produces buffs that meet the most exacting requirements of the metal finishing industry Always insist on original quality. Specify JOE-D-America's finest Bias Sisal Buffs.

The JOE-D line covers a complete selection of Bias, Bias Spoke (Finger), and Conventional Buffs — as well as quality Polishing Wheels.

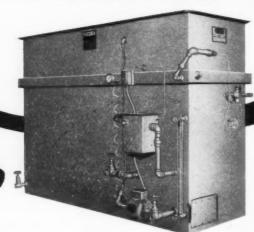


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WRITE TODAY!

JOE-D SANDWICH, ILLINOIS . TELEPHONE 2171 The CIRCO degreaser! revolutionary new design means:

30% LESS SOLVENT! 40% LESS MAINTENANCE! LASTS TWICE AS LONG!



No other degreaser has ALL these features:

**CORROSION RESISTANT COILS** Condensate coils are onepiece spiral copper tubing with nickel plated exterior surfaces. Exterior resists degreasing solvents and hydrolysis . . . interior is superior to galvanized pipe for water transport.

**RECESSED CONDENSING COILS** Condensing coils are recessed and placed directly over the storage tank, providing smooth, obstruction-free walls and easy operation.

**DOUBLE THE LIFE** Water condensation and resultant hydrolysis will not take place along sides, causing them to rust. No rusty condensate troughs to patch or replace . . . a tremendous improvement, doubling the life.

**LEAK-PROOF PUMP** Circo's new pump has performance, corrosion resistance, longevity and non-leaking qualities. All pumping parts are fabricated of stainless steel . . . the

rotor and end plates are nickel clad. The new Circo pump, without stuffing box, rotary seals, coupling drive sheaves, or V belts, uses a rotating magnetic field to drive the impeller, and is virtually foolproof. It's safely sealed—leaking is impossible.

DEMAND TYPE WATER CONTROL A water temperature regulator to accurately control water in the coil and insure a 90° to 120° F. temperature for water entering the water jacket, eliminates water condensation which would result in hydrolysis, rusting and acid solvent.

CIRCO DEGREASERS for every need are available in corrosion-resistant compact units for the small shop, large automatic models for mass production, and all sizes between. Sturdy and dependable vapor, solvent-vapor-solvent, vapor-spray and ultrasonic models make Circo the standard for performance and long life.

Complete information on request.

Bulletin OP2 on solvent degreasers

Bulletin UC1 on ultrasonic equipment

Bulletin 521 on metal washing equipment

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CIRCO EQUIPMENT COMPANY



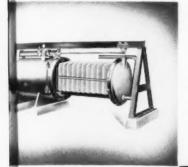
Since 1923

51 Terminal Avenue. Clark (Rahway), New Jersey OFFICES IN PRINCIPAL CITIES • NATION-WIDE ENGINEERING FIELD SERVICE

#### What's new in plating equipment? . . .

# See Industrial

Every one of these units is the latest of its kind . . . with exclusive features to help you improve plating quality or save costly materials. When you enlarge or add to your plating lines—see Industrial . . . you'll find that something new has been added.



#### HORIZONTAL FILTERS

These filters offer many features to increase efficiency in filtering operations. Hydraulically operated, quick opening door and fully exposed leaf assembly simplifies cleaning and inspection. Built to ASME Code with self-cleaning features: air wash, sluicing or shaking.

Ask for Bulletin NH-155



#### VERTICAL FILTERS

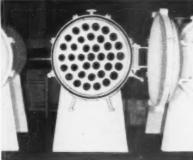
Built to ASME Code in a wide range of materials and sizes. Available with such convenient features as: bottom-opening chambers, clean-out doors, quickopening covers, jacketed shells . . . and time-saving rapid cleaning devices: air wash, sluicing and mechanical shakers.

Ask for Bulletin 100



New operating convenience for smaller filtration jobs. Ideal for polishing liquids, as a trap filter and as a scavenger for larger filters the cost is less than a scavenger plate. This filter's "inside-out" flow system and the use of simple filter paper liners makes it unusually easy to operate.

BULLETIN 75-160-755



Clean themselves in seconds without back-flow pumps or filtered water supply. Hydra Shoc is a tubular filter with hard wearing synthetic fabric sleeves. The unusual self-generated pressure system provides a back-surge that instantaneously expands the sleeves, dislodges and drains off the filter cake.

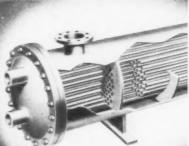
BULLETIN 114



#### **EXCHANGERS**

With operating costs figured in pennies per thousand gallons, Industrial ion exchangers are specially built for water purification, waste treatment, metal recovery and other solution treatments.

BULLETIN 200-SM



#### HEAT **EXCHANGERS**

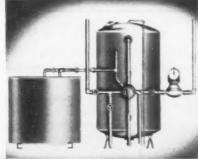
For corrosive or non-corrosive liquids and gases. Industrial builds these to suit the job and can furnish all auxiliary pumps, piping and

**BULLETIN 600-2-354** 

#### WATER SOFTENERS

One operation, rapid Zeolite Water Softeners. Fully automatic, semi-automatic or manual controls.

BULLETIN 211



#### WASTE TREATMENT

For recovery, or destruction of chemicals for disposal. Many Industrial recovery systems have paid out their cost in a few months. Complete service from solution analysis to installation.



#### CENTRIFUGAL PUMPS

Specially designed rubber lined pumps for corrosion and abrasion resistance. Only a cutaway model can show the many features that spell long life and low maintenance.

BULLETIN 300







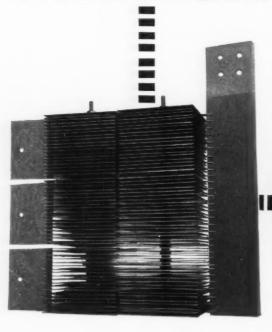
Industrial

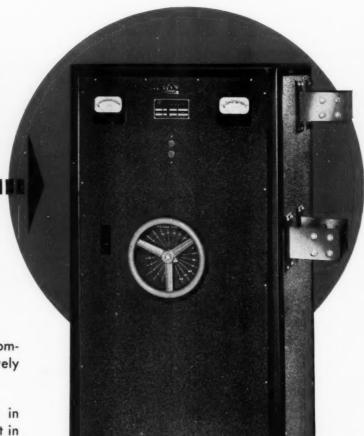
FILTER & PUMP MFG. CO.

5906 OGDEN AVENUE . CHICAGO 50, ILLINOIS



# SELENIUM RECTIFIERS





CROWN SELENIUM RECTIFIER stacks are custombuilt to rigid specifications and are conservatively rated to insure long life and high efficiency.

CROWN RECTIFIERS contain only the finest in materials and workmanship. They are compact in design, are completely protected against overloads and excessive temperatures, and are factory-tested under field conditions for your protection.

Competitively priced, they are available in all voltage and current ranges, in all types of manual or automatic controls, giving the finest equipment available at low initial cost.

Dependable D.C. Power for Electro-chemical Requirements



CROWN

SELENIUM

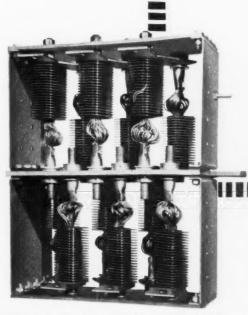
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MANUFACTURED BY

CROWN CHEMICAL AND ENGINEERING CO. 4722 WORTH ST., LOS ANGELES, CALIF.



# GERMANIUM RECTIFIERS



CROWN GERMANIUM RECTIFIERS are high in efficiency, over 90% in some ratings. They contain only selected and pre-tested balanced germanium junctions which are positively protected against current overloads and short circuits.

CROWN RECTIFIERS are designed to give continuous trouble-free service and are factory-tested to perform satisfactorily under all operating conditions.

You can purchase a CROWN GERMANIUM RECTIFIER in any voltage or current range with any type of manual or automatic control at a competitive price, giving you the highest quality at low initial cost.



For more specific and technical information concerning your application, write Crown Chemical and Engineering Co. today...or contact your nearest authorized distributor.

#### GERMANIUM RECTIFIERS

"Chuwa" selenduk "Adio" darkanduk "Macoualah" deadass

WEAVER ENGINEERING & SUPPLY, Grand Prairie, Texas • CARMAC CHEMICAL COMPANY, Pittsburgh, Pa.

THE CHEMICAL CORPORATION, Springfield, Mass. • CROWN RHEOSTAT & SUPPLY CO., Chicago, Illinois
WALGREN COMPANY, Grand Rapids, Mich. • CANTON PLATERS SUPPLY, Canton, Ohio • GEORGE V. MORRIS, Philadelphia, Pa.

W. M. FOTHERINGHAM, Buffalo, New York • MITCHELL EQUIPMENT CORP., Sylvania, Ohio

#### 36

PENNSALT CLEANER 36 is an extraheavy-duty alkaline soak-tank cleaner
that removes the bulk of the greasy, oily
soils on steel or copper parts before
electrocleaning. Thus the electrocleaner
bath lasts longer, works more efficiently
on smut and impacted soil. Pennsalt
Cleaner 36 keeps soil in suspension
once it's removed, won't let it
redeposit on the work.

#### K-8

PENNSALT CLEANER K-8 is the king of all electrocleaners, recommended for removal of the toughest impacted soils and pickling smuts. An excellent conductor, K-8 lets maximum current flow at low voltages. Plating rejects drop to a new low—your production becomes more profitable.

#### PM-90

pennsalt cleaner pm-90® is a balanced inhibited-acid pickling agent that removes all traces of rust and scale, leaving the base metal bright and ready for a highly reflective plate. Special conditioning of PM-90 does away with the film problems formerly associated with acid pickling. No more fume problems, either; pickling is fast and trouble-free.



Metal Cleaners • Phosphate Coatings • Cold-Working Lubricants

# Super-clean control all down the line with Pennsalt's NEW Super-cycle

Now—electroplaters can be sure of complete control over the cleaning cycle, and thus benefit through an amazingly bright, uniform plate...a drastic cut in plating rejects... true economy in chemicals and operation. By using the new Pennsalt Super-Cycle, you assure yourself a perfect balance of high-potency cleaners designed for each other and for your plating line. These cleaners are great separately—but they're SUPER when used in the Super-Cycle!

LONG BATH LIFE. The unusual teamwork of the Super-Cycle extends the life of all three baths by giving one specialized job to each cleaning tank. Thus your steel or copper parts are speeded through the cycle, given "expert" care in each stage. Results: A wider margin of safety, a top-quality plate, a shattered record for low rejects.

WATCH THE SUPER-CYCLE WORK in your plating line, and learn the pleasant price facts about all three cleaners bought as a unit! Call the Pennsalt man for a demonstration in your equipment, or write Metal Processing, Dept. 213, Pennsylvania Salt Manufacturing Company. East: Three Penn Center Plaza, Philadelphia 2, Pa.; West: Woolsey Bldg., 2168 Shattuck Ave., Berkeley 4, Calif.

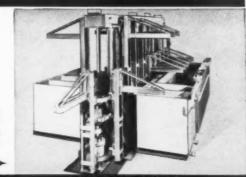
A BETTER START FOR YOUR FINISH

#### AN AUTOMATIC MACHINE FOR EVERY METAL FINISHING NEED



Low initial and low operating costs are features of this newly introduced small automatic which has a big capacity for its size.

> Unit's load capacity, mechanical flexibility and lift design meet tomorrow's increased safety and production requirements.

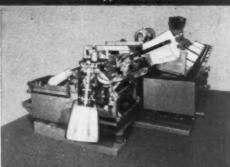


"STEVADOER"
Rack Type Machine



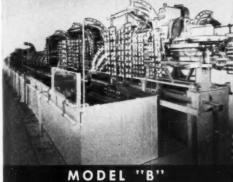
A compact automatic processing machine, embodying the famous Stevens auxiliary cam shaft and lifters for rapid vertical transfer.

> A proven automatic barrel machine for plating and processing small parts. Only unit with fully automatic load and unload features.



MODEL "C"

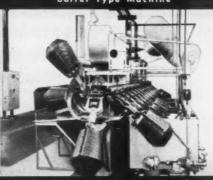




Large capacity automatic barrel unit for volume production. Embodies major

features of the famous Stevens Model "C" machine.

Features rapid, continuous movement processing employing hump type cams. Design permits utmost mechanical and cycle flexibility.



"SUPER E"

The Stevens family is now complete. Six Stevens automatic plating and processing machines fill every need for metal finishing.

Latest addition to the complete line of Stevens automatic metal finishing machines is "Little Steve." Announcement of the new "Little Steve" follows by a few months the recent introduction of Stevens heavy-duty "Stevadoer" Processing machine.

Now you can go automatic in any and all of your plating

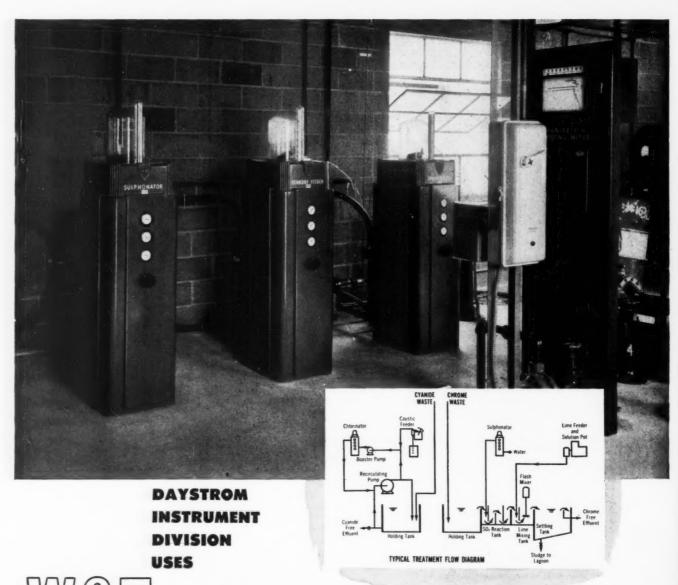
operations. Stevens can furnish a job-engineered, costcutting, fully automatic machine that will answer every production need whether it be for electroplating, cleaning, anodizing, bright dipping. You will get better control, better finishes and eliminate rejects with Stevens Automatics.

Why not see how one of Stevens great family of automatics can be engineered for your metal finishing operations? Call in a Stevens Sales Engineer today or write direct to -

BRANCHES: BUFFALO • CLEVELAND • INDIANAPOLIS • NEW HAVEN

VISIT US AT OUR SUITE HOTEL STATLER
DURING THE AMERICAN ELECTROPLATERS
SOCIETY NATIONAL CONVENTION





# Cyanide & Chrome Waste Treatment

The Daystrom Instrument Division of Daystrom, Incorporated, located at Archbald, Pennsylvania, has provided a compact and efficient treating plant to destroy the toxic components of their plating waste. The treatment plant has been in continuous operation since 1953.

The cyanide bearing waste is treated with chlorine and caustic, using a W&T Water Diaphragm Chlorinator and a W&T Chemical Solution Feeder. The treatment breaks down the cyanide

to harmless carbon dioxide and nitrogen gas components.

The chromium bearing waste is treated with sulphur dioxide and lime, using a W&T Sulphonator and a W&T Dry Chemical Feeder. The treatment removes the toxic chromium and other heavy metals from solution, to be disposed of as sludge.

If you would like more information on Wallace & Tiernan cyanide or chromium waste treatment, write for bulletin RA-2120-CM.



#### WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

1-52



. For more information about ttelle-developed processes, get in 1ch with any of these authorized ttelle Development Corporation tributors. Each is fully equipped give you complete data and hnical help.

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also San Francisco,
 Portland, Seattle and
 Salt Lake City.

Be sure to read about "Bright LUSTRALITE 10" on the opposite side of this page . . .

#### other Battelle Processes that simplify plating, add beauty and improve products

#### Electropolishing

A wide range of finishes is available. Gives products new sales values. Extraordinary smoothing action produces a micro-polished effect. "True metal color" is achieved with a lustre not attainable with belts or wheels. Metal surfaces remain undamaged.

**Electrodeburring**—A variation of electropolishing, excellent for smoothing sharp, burred metal for safe handling and precision functioning. Indispensible for parts having burrs in hard-to-reach places. For many items, electroburring plus electroplating produces the best possible and most economical finish.

#### **Chemical Polishing**

Smooths as it brightens. Won't etch. Brings out basic lustre. Especially suitable for small parts and those of intricate design. Can be plated over. Easy to install and operate . . . requires only a tank and heating element.

#### STANDARD Bright Nickel

Produces mirror-like surfaces. Has excellent leveling action, ductility, and corrosion resistance. Very hard (Knoop 500-580) and wear resistant. On 18-gauge steel, can be bent around a  $\frac{1}{2}$ -inch radius without cracking.

#### **Tin Immersion**

Coats copper and a variety of brasses and bronzes against "green water." Coats wires against corrosion. Easily controlled cold bath.

**LUSTRALITE Electroplating Processes** also include LUSTRA-LITE 20, a rich golden plate; LUSTRALITE 10, a deep bronze red; and LUSTRALITE 45, silver white, of sterling appearance. Data upon request.

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AUTOMATIC UNLOADING! Only plating machine built from which work is unloaded from racks or wire fingers without operator's attention.



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COMPLETELY VERSATILE! Individual tanks and carrier sections may be quickly removed to shorten machine-or added to lengthen machine. Can be easily installed to fit any unusual or limited floor space. The Daw Junior requires extremely low headroom.



SAVES PLATING TIME! Continuously moving cathode permits plating at higher current density thus reducing plating time far below machines with intermittent movement.



MINIMUM DRAGOUT! Automatic cam lift between tank-to-tank transfers eliminates solution dragout to absolute minimum regardless of shape or size of workpiece.



MONEY MAKER! Daw Junior has proved itself one of the most efficient machines ever developed for plating small and medium size parts with utmost speed and economy.

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LASALCO, INC.

#### NO CURE-ALL FOR SALE!

Experience with plating waste treatment has shown staff and consulting engineers that no one process or type of equipment is generally applicable to all problems. Thorough evaluation of the many factors involved is necessary in each case.

Whether the solution required is ion exchange or precipitation Graver has complete equipment to do the job.

#### Graver can offer you:

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- \*Engineered flexibility to suit individual requirements
- \*Advanced equipment design proven in hundreds of installations
- \*Over 45 years' experience in the water and liquid treatment field





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T-136 — Plating Waste Solutions — Recovery or Disposal
T-130 — Ion Exchange A Practical Tool in the Plating Room
T-123 — Applications of Ion Exchange to Plating Plant Problems



Industrial Waste Treatment Dept. W-113

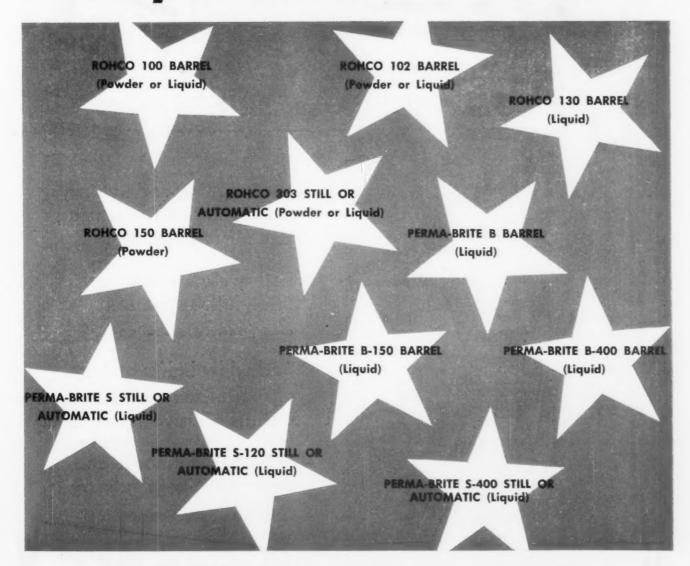
GRAVER WATER CONDITIONING CO.

A Division of Graver Tank & Mig. Co., Inc.

216 West 14th Street, New York 11, N. Y.

METAL FINISHING, June, 1956

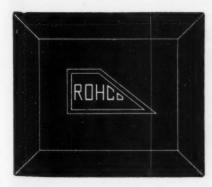
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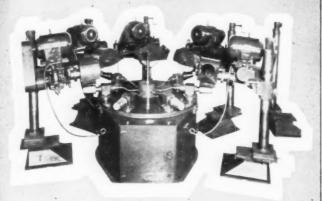


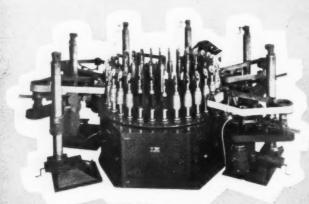
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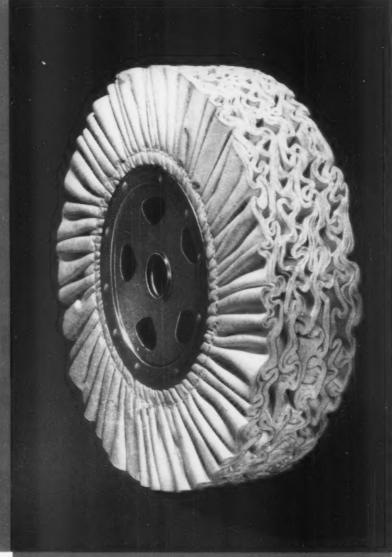
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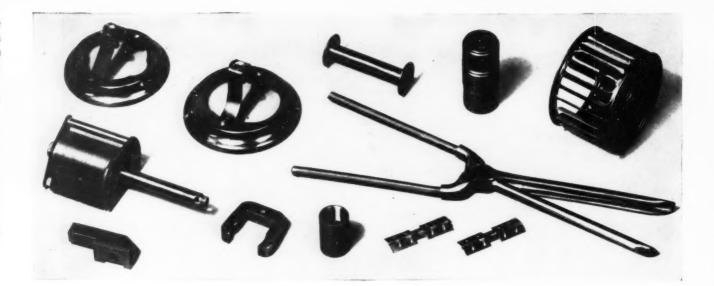
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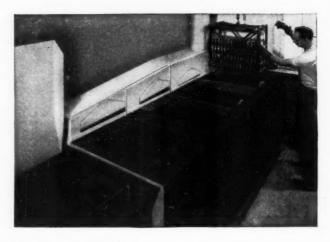
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The 5 important features you get with Du-Lite:

- 1 A thorough study of your requirements.
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- 4 = Production tested chemicals to insure constant uniformity.
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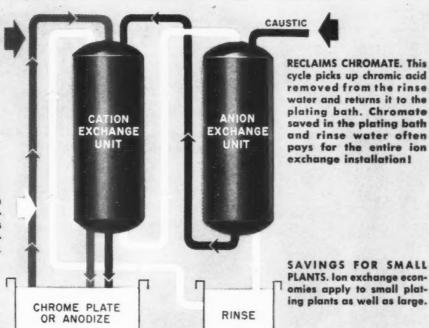
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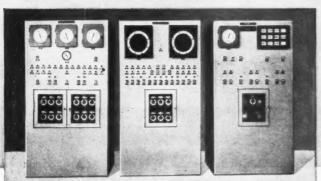
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RENEWS PLATING BATH. This cycle removes aluminum, copper, iron and other impurities ... allows continued re-use of bath ... eliminates disposal problem. Compared with the usual toxic-waste disposal equipment, ion exchange saves up to 50% on initial costs, 75% on operating costs, 80% on floor space.

RENEWS RINSE WATER. Cation unit removes metallic impurities... anion unit removes chromic acid... allowing continued reuse of rinse water.

Cuts consumption 90%!







AUTOMATIC CONTROLS for ion exchangers in an auto parts plating plant. These controls simplify operation. No specially trained operators or technicians required.

**OThe Permutit Company** 

### Ion Exchange Cuts Plating Costs

Modern ion exchange equipment really pays off for plating plants. Here's why:

Faster production. Dip periods are shorter, and there's no down-time for dumping because baths are always at full strength. Time savings are biggest for bright-dipping, anodizing, etching, stripping.

Better quality. Clean baths produce more uniform plating deposits. Clean rinses prevent water stains and spots.

Lower operating costs. Contaminant-free baths use less current. The improved quality means fewer rejects . . . and reduced polishing and wiping costs.

A large aircraft manufacturer saved \$10,000 on anodizing in the first year with ion exchange. A leading auto maker prevented a stream pollution shut-down, improved quality, reduced costs . . . and uses the same

ion exchange equipment for treating other process water in the plant!

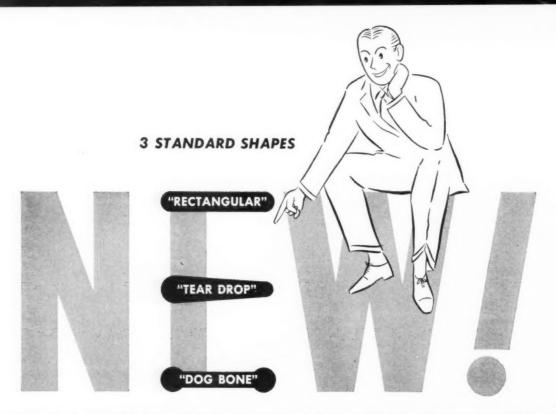
Largest manufacturer of ion exchange equipment, The Permutit Company, is the only firm that offers a complete ion exchange service: rinse water or bath analysis, engineering, equipment, ion exchange resins and automatic controls . . . all from one source.

For details, write: The Permutit Company, Dept. MF-6 330 West 42nd St., New York 36, N. Y.

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ION EXCHANGE for Water Conditioning
Chemical Processing • Industrial Waste Treatment



### SHAPED, EXTRUDED APW SILVER ANODES

CONTROLLED GRAIN SIZE: APW EXTRUSION PROCESS\* controls grain size within definite limits-minimizes sheddings



\*Pat Panding



ROLLED FLAT PLATE ANODE SECTION: Photomicrograph illustrates highly irregular, uncontrolled grain size—a major cause of shedding and rough electrodeposits.

The three standard shapes of APW Extruded Anodes were developed to extend the useful life of anodes—to lower plating costs!

Through scientific design, the distribution of mass material helps to maintain a more efficient ratio between anode weight and active surface area. After 85% by weight has been plated off, this APW anode retains 80% of its original active surface area! You profit three ways with longer anode life, minimized polarization and less silver scrap to be refined.

Another equally important advantage of the new APW Extruded Anode is the small, uniform grain size—controlled between definite ideal limits! As a result, corrosion is smooth and uniform for consistently smooth electrodeposits. Shedding is virtually eliminated—rejects are a comparative rarity!

To be certain the silver you buy in anodes is used most efficiently, APW will develop special anode shapes to meet particular plating bath conditions. We'll be glad to assist with your anode problems.

APW EXTRUDED ANODE SECTION: Note small, fully controlled regularity of grain size to promote uniform corrosion, smoothest electrodeposits and less rejects.

# THE AMERICAN PLATINUM WORKS

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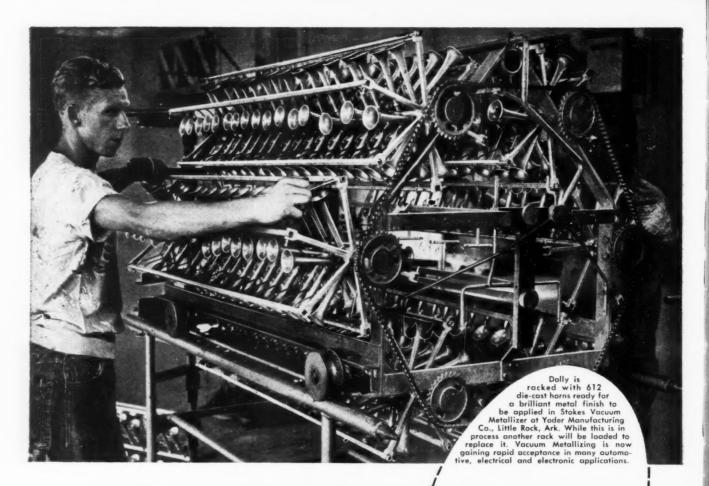
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anodes and electroplating chemicals

56



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Ornaments and display materials, toys, trophies, furniture handles, emblems, jewelry, nameplates, reflectors and many other metal parts are now largely vacuum metallized. Automobile parts are a new and fast-growing market. Electrical and electronic parts offer unlimited possibilities. Some installations deliver as high as 100 loads of finished parts per 24-hour day from a single Stokes Vacuum Metallizing unit without use of specially skilled labor. Stokes trains your workmen and you start into production.

Units of 24, 36, 48 and 72-inch diameter are available, some fully automatic in operation. Floor space requirements are low, as these are integrated "package" units of the fastest and most efficient type.

Stokes Laboratory will metallize your samples, evaluate your application, recommend techniques to be employed, plan cycles, report on costs... and share with you the benefits of Stokes' 40 years of leadership in high-vacuum technology.

Write today for a comprehensive brochure, "Vacuum Metallizing Today," which describes the applications and techniques of Vacuum Metallizing.

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It's got to be quick to be good! Dow distributors... and their thousands of satisfied customers... know from experience that no other producer of vapor degreasing solvents gives more attention to service than Dow.

Three separate producing plants assure adequate supply of DOW TRICHLOROETHYLENE... and that's becoming particularly important. The six additional Dow shipping terminals mean that supply is delivered with dependable speed. And Dow distributors carefully maintain convenient warehouse stocks in all sections of the country.



Dow Trichloroethylene saves you concern and expense in other vital ways, too. This solvent's stabilized uniformity gives you a smoother, trouble-free operation. Its rugged "work horse" cleaning characteristics generally result in decided savings on cost per run. Well-qualified, up-to-the-minute technical assistance is available on request. Better check your trichloroethylene supply today. The same distributor you'll want to contact for dow trichloroethylene can help with your specialized solvent needs, too; he also gives quick delivery on superior, high-boiling dow perchloroethylene (Industrial), methylene chloride and the wonderfully versatile, new cold cleaner, chlorothene\*. For full information on any or all of these efficient solvents, why not drop a line to the download company, Dept. S 940C, Midland, Michigan.



you can depend on <u>DOW SOLVENTS</u>





# and cuts costs two ways because it's completely automatic!

fast cutting, easy cleaning with

# uimatic

the perfect liquid compound for all metal finishing

What are the two big cost factors in your buffing room? Chances are buff life figures big when you're talking production costs . . . and the second big factor is production time itself. Liquimatic Application Systems are licking these two cost problems in buffing rooms all over the U. S.-because Liquimatic is automatic. An electrically timed system feeds Liquimatic Buffing Compound to the buff in the exact amount to give you the exact cut you need. Because the buff is continually lubricated, buff life is extended up to 400%!

And with Liquimatic there's no compound wasted, no nubbin problem, no hand application, no changing bars -think of the cost savings you can effect in your buffing room with these advantages! Savings in buff life alone can soon pay for a complete Liquimatic Application System . . . a system that will continue to save you money - automatically.

Check the other features of Liquimatic Buffing Compound . . . then write today for your free copy of Liquimatic's big, new folder that tells the whole costsaving story of Liquimatic in your buffing room.



These additional Liquimatic features mean real savings in terms of time, money, safety-

- longer buff life
- completely automatic
- fast cutting
- easy cleaning

- non-settling
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- sprayable viscosity
- adhesive slow-wearing buff face

**Liquimatic** . . . gives more buff mileage



Your H-VW-M combination-

of the most modern testing and development laboratory

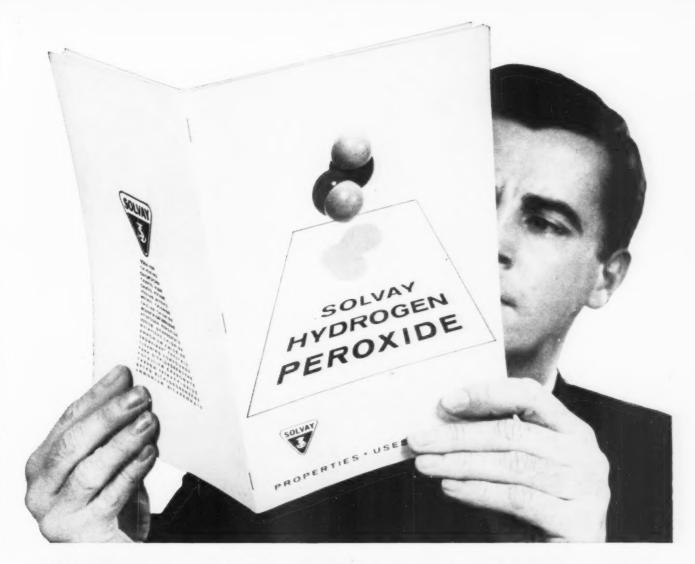
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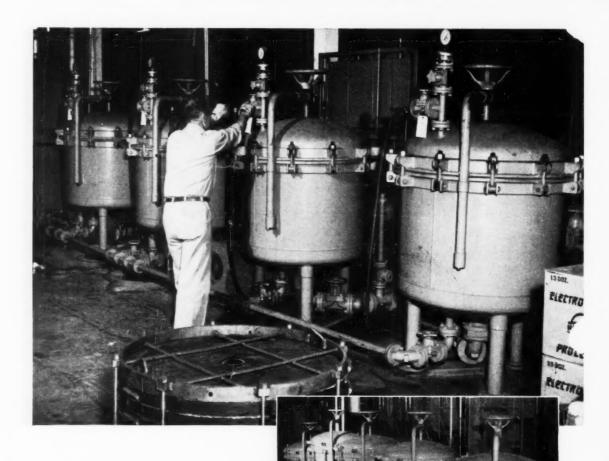
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**Gives**Low Cost Filtering
of Plating Solutions –

Plating Plant Engineers will find Sparkler filtration engineers most co-operative to work with on installations of any size.

Write Eric Anderson



2,208,000 gals. of bright nickel solution are filtered in these four Sparkler Horizontal Plate filters (top illust.) through a continuous 5 day cycle with 24 hour operation. Filters are cleaned once a week by lifting out the plate cartridge and replacing it with a fresh dressed set of plates. Only a few minutes is required for this operation.

In the same plating plant, (lower illust.) the four large Sparkler filters are used to filter suspended matter from Ronal bright copper solution. These filters have a flow capacity of 4800 G.P.H. each. The small, far end unit filters suspended matter from a copper strike bath. Capacity 2,100 G.P.H.

On occasion these filters are employed for filtering out activated carbon and lime from copper solution and activated carbon and nickel carbonates from nickel solution.

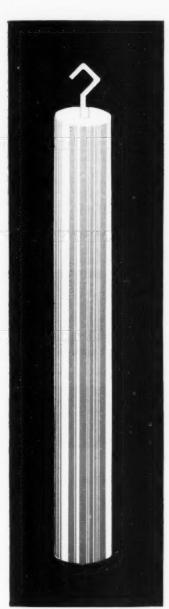
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Sparkler International Ltd.

Manufacturing plants in Canada, Holland, Italy, and Australia.

REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

# your plating problems dissolve with top dissolution



# OFHC

OFHC Anodes eliminate the need for bagging ... minimize anode particles in plating solutions ... cut metal losses in scrap by as much as 30 percent. The reason: OFHC Anodes are totally free of oxygen and deoxidants, have high density and low porosity. These characteristics mean fewer insolubles, uniform dissolution, top anode efficiency.

As proved in pilot-plant tests and commercial use, OFHC Anodes yield smoother plating than anodes of any other type... and with less scrap

and less sludge! The result: More and more plating men are turning to OFHC Anodes to end plating roughness, and to reduce losses of metal in solution build-up and scrap.... Three shapes available in all lengths from 17 inches to 93 inches.



Oval



Round 3" dia.

#### FREE LITERATURE

Exhaustive tests at the foremost Independent Industrial Research Laboratory in the U.S. strikingly demonstrated the superiority of OFHC Anodes. They are now proving themselves in commercial use. Find out how OFHC Anodes can solve your plating problems...send today for free copies of the Research Laboratory's Report on OFHC Anodes and AMCO's booklet Improving Your Electroplating Operation.



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☐ Independent Research Laboratory's Report on OFHC Anodes ☐ Improving Your Electroplating Operation

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- Made in all colors
- Color-constant
- Tarnish-Resistant

- Brilliant in Finish
   Bottled by Troy weight
   Made from assayed US Treasury Gold only
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NOW AVAILABLE - Variable-type Tank . specifically designed for Rheostats . . precious metal plating.

#### ... Will Save You Time!

#### ... Will Save You Money!

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This amazing new product cuts gold deposit 50%! It has maximum resistance to contact and obrasion, high throwing power, low resistance to high frequency, and metal and plastic remain firmly bonded. New Hard Gold Solution presents no control problem and it plates at low temperatures.

Small samples will be plated at no charge

- POTASSIUM GOLD CYANIDE SALTS
- LUSTROUS WHITE RHODIUM SOLUTION

We are fully equipped to reclaim old gold and rhodium solutions.

ONE OPERATION

#### Antique Gold Solution

A QUALITY SOLUTION, with excellent color consistency and remarkable ease of operation. No production problems -truly economical, too!



#### avoid costly rejects due to unacceptable coating thickness...

For quality control and acceptance tests, measure thickness of coatings on metals the easy, accurate, non-destructive way, with the . . .

Widely used by industry and government for accurately measuring the thickness of:

- 1. Non-magnetic coatings (metallic or non-metallic) on magnetic base metals.
- 2. Nickel coatings on magnetic or non-magnetic base

Measures coatings on plane, convex or concave surfaces. Gives speedy and accurate results. Easy to use by non-technical personnel.

Avoids expensive rejections due to coatings that may be too thin, or non-uniform. Eliminates the expense involved in replating or discarding specimens spoiled by destructive tests . . . every piece tested is unharmed and ready for use or shipment. Saves materials wasted by coatings thicker than necessary. Its use leads to the discovery of faults that may exist in plating methods or equipment.

Write for Bulletin 2253- G

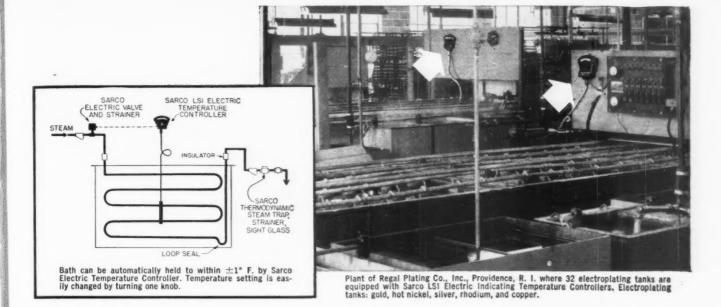


Coating on cylindrical object being measured with Magne-Gage



AMERICAN INSTRUMENT COMPANY, INC.

Silver Spring, Maryland • In Metropolitan Washington, D. C.



## **How low-cost Temperature Control** ended "blue haze," pitting, burning

Regal Plating Co. now gets high quality plating with minimum of rejects

This well-known job plater specializes in high quality plating of costume jewelry and fishing lures. During an expansion program management ordered the elimination of these common plating difficulties: blue haze on nickel plate, pitting of copper plate and burning of sharp points.

These troubles were due to creeping bath temperatures...the result of manual temperature control, which is always unreliable.

To solve these problems and step up efficiency, Regal installed Sarco LSI Electric Indicating Temperature Controllers on all 32 plating tanks. Result:

above troubles completely eliminated, rejects greatly reduced, no more burnishing of nickel plate.

Sarco Automatic Temperature Control is surprisingly low in cost, simple, accurate, dependable. It pays for itself by lowering rejects, improving plating quality, and preventing waste of expensive solutions.

Investigate the advantages of Sarco Temperature Controllers. Write for Handbook No. 6 or consult your Plating Supplies Jobber. Sarco Company, Inc., Empire State Building, New York 1, N. Y. Representatives in principal



#### COMPLETE SYSTEM FOR AS LITTLE AS \$130 A TANK!

Think of it ... automatic temperature control that often pays for itself in

Accurate to plus-minus F. Simple. Dependable. Easily installed.

Easy-to-read controller dial clearly indicates temperature being maintained. Temperature setting quickly changed by turning one

### SARCO quality and output

improves product

TEMPERATURE CONTROLLERS • STEAM TRAPS • STRAINERS















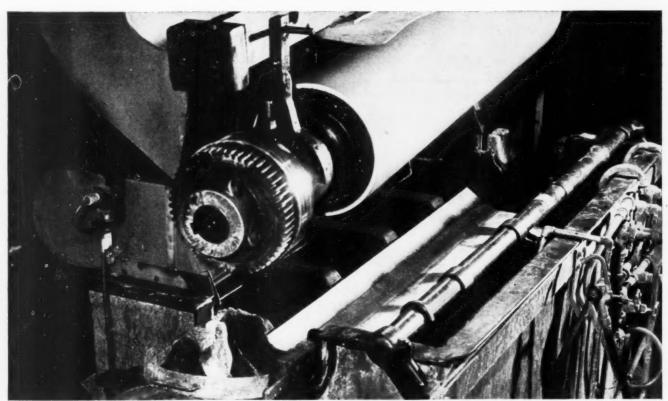












View of plating tank, drained to show location of the 67" x 3" x 1" "Plus-4" Anodes.

# Electroplating copper shells on rotogravure cylinders is simpler and faster with "Plus-4" Anodes



Triangle Publications, Inc., has an enviable reputation for high-quality 4-color gravure reproduction at high speed. Here are three of its leading magazines.

TRIANGLE PUBLICATIONS, INC., Philadelphia, made comparative tests, for a 22-month period, of "Plus-4" (Phosphorized Copper) Anodes in the electroplating of rotogravure cylinders.

The results were summarized by the Director of Triangle Publications' Research and Development Laboratories: "'Plus-4'Anodes give an improved copper printing surface with substantial savings in time, labor, and material—and our men like to use them."

Plating procedure: 1500-lb. steel rotogravure cylinders, 67" long and 43" in circumference, are cyanide-copperplated .0005"—then acid-copperplated .040" to .080". This surface is ground and polished and coated with immer-

sion nickel. A .005" copper Ballard shell is acid-plated over the nickel—the shell which is engraved and forms the printing surface. The nickel layer makes it possible to strip the outer shell off after printing. Another shell is then plated on the cylinder for the next job. The dense physical quality of the unchromed copper Ballard shell makes it possible to print 1,250,000 impressions from a single set of design cylinders.

For electroplating, the cylinders are placed horizontally in the acid-copperplating solution ½ submerged, and rotated. The anodes lie parallel to the cylinder, 1½" to 2" away. Current density is 280 to 300 amps per sq. ft.

Solution balance: With other anodes, solution balancing to remove copper sulfate and add acid is necessary 20 to 22 times a year. With "Plus-4" Anodes, the solution has been balanced only 4 to 6 times a year. This not only made substantial savings in copper sulfate and acid, time, and labor—but also gave improved control of the plating process by minimizing cyclic changes in the solution.

Anode corrosion: When anodes corrode faster in length than width, low areas develop at the ends of the roll—and anodes must be scrapped. Scrap loss with other anodes has run 8 to 10%. "Plus-4" Anodes corrode so uniformly, however, that scrap was only 1 to 2%. They produce uniform deposits with less attention and checking.

Cathode deposit: With "Plus-4" Anodes the sharp reduction of copper lost as sludge and in copper sulfate dumped accounted for a 12 to 14% increase in cathode deposit.

See for yourself: Across the entire field of acid-copper electroplating—"Plus-4" Anodes are saving money, making work easier. Write today for details of how you can get a test supply of "Plus-4" Anodes sufficient to fill one tank. Address: The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

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(Phosphorized Copper)

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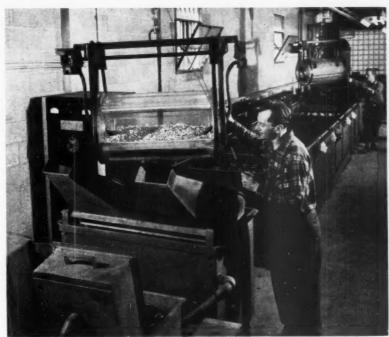
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# Platers Swing to G-S for Bigger Profits! Report up to 50% increased production!

Larger loads, faster plating at higher current densities, "through cycle," and longer equipment life, with no down time! You wanted these advantages, and now G-S has incorporated them all in the new Gill-Singleton "Cogged-V-Belt Drive" Plating Barrel. No other equipment can match it, feature-for-feature, at any price. That's why G-S equipped plating plants are out-producing, out-earning all others of comparable floor area and capital equipment

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At an Allied Products' Detroit plant, Wyandotte's manager of industrial sales, Ed Kubis (left), and Plant Engineer John Rhodes discuss effectiveness of Wyandotte BN as a metal cleaner and Wyandotte R-2 as a rust preventer.

# Allied Products cleans 8000 lbs. of forgings an hour with Wyandotte BN!

Serving the construction industry and 75% of the automotive industry with cold-forged bolts and fasteners, Allied Products Corporation, Detroit, Michigan, has been a Wyandotte customer for nearly 15 years.

Allied Products is sold on Wyandotte metal cleaners—using BN for tumble-washing parts before heat treating, and R-2 in the water rinse for in-plant rust protection. This is done in a combination beltand-drum type washing machine, which cleans and rustproofs both

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A free-rinsing industrial detergent — with high soil tolerance, and controlled uniform quality—Wyandotte BN has a silicate-synthetic detergent base formulation for long life, maximum detergency.

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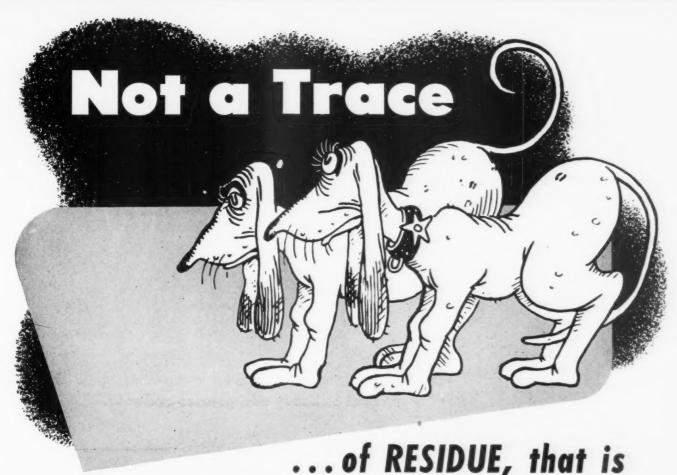
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METAL FINISHING, June, 1956



# with <u>NEW</u> AHCO Burnishing Compounds

Residue vanishes in a water rinse... burnished surfaces are left clean, bright, and film-free, but it's no mystery because this new series of AHCO Burnishing Compounds is formulated only from non-saponaceous materials that contain the last word in surface-active agents. These compounds are free-flowing, dry, non-toxic, and non-corrosive powders which are, of course, freely soluble in water. They're prepared especially for applications where the sticky residues from soap-like mixtures are objection-

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For full details about AHCO Burnishing Compounds write today for Bulletin B-10 to Apothecaries Hall Co., 22 Benedict Street, Waterbury, Connecticut.

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# **Emulsion Cleaner**

#26

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**EMULSION CLEANER** #26 is a general utility cleaner which cuts cleaning time when used prior to an alkali cleaner. Emulsion Cleaner #26 will even increase the life of the alkali cleaner.

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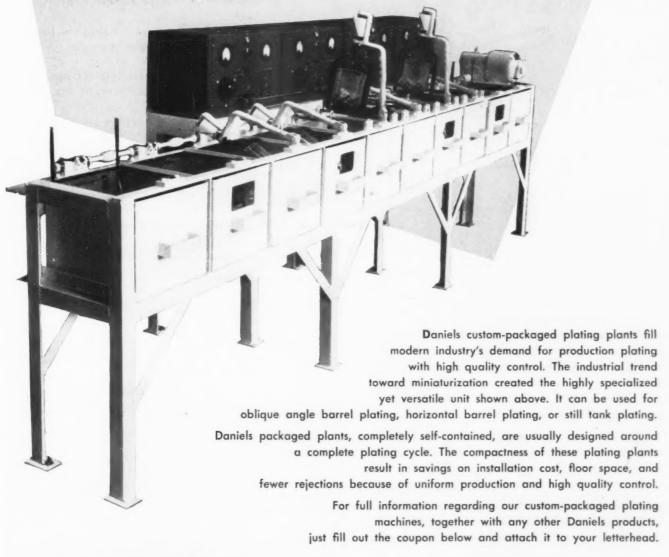
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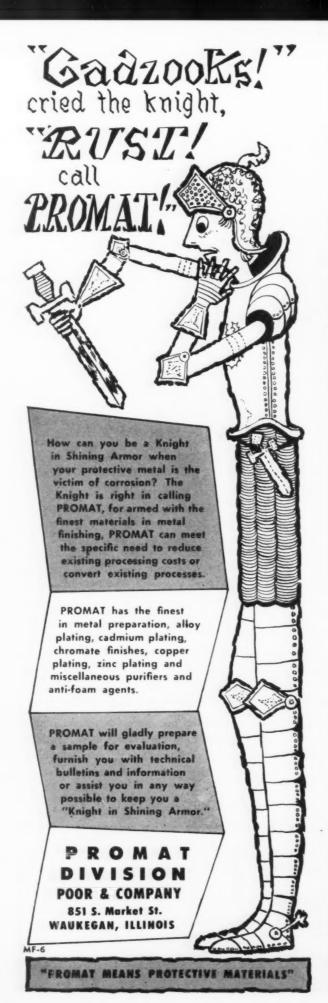


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Gold
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Nickel
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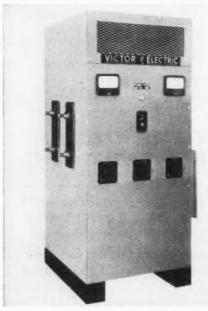
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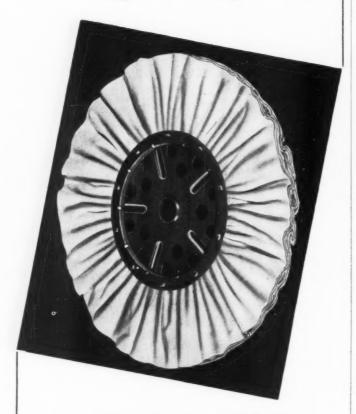


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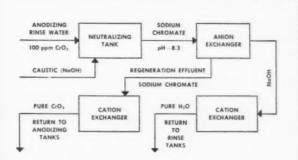
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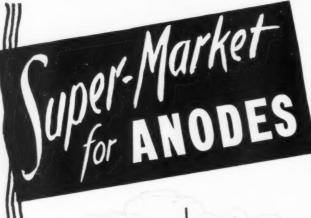
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APRIL 26,1956

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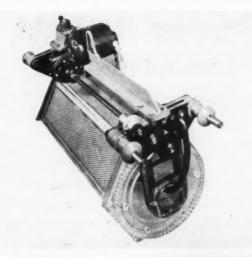




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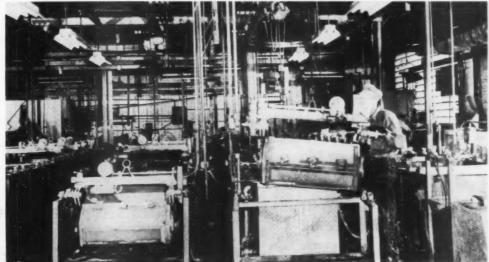
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# LAZO BARRELS





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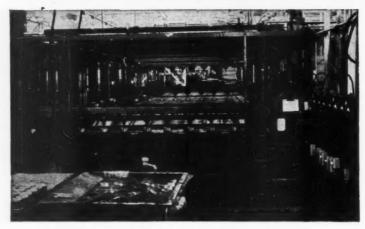
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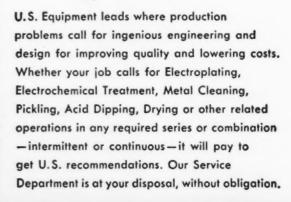
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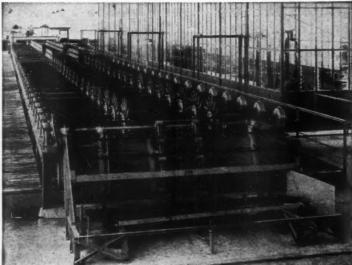


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U.S. Fully Automatic Conduit Pipe Processing Installation. Performs 24 operations in one continuous cycle including cleaning, acid treatment, zinc plating pipe exterior, enamelling and baking interior surface. Capacity—over 60 million feet of pipe per year. Glass enclosure houses U.S. Generator Equipment.

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FINISHING PUBLICATIONS, INC.

# WESTWOOD, N.J. FINISHIN

DEVOTED EXCLUSIVELY METALLIC SURFACE

JUNE, 1956

Volume 54 Number 6

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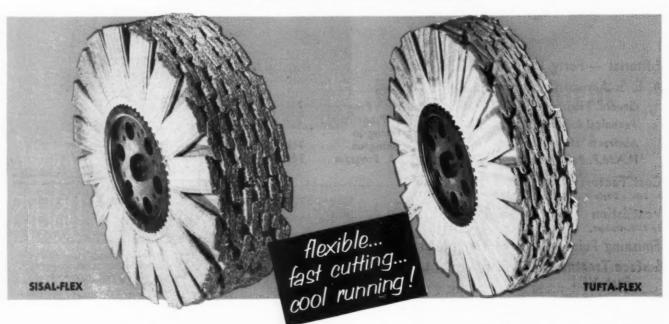
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- Each buffing pad has extra fold . . . gives more buffing face, carries more compound on circumference and leading edges.
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- Four rows of stitching, for strength, longer wear.
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- Double fold provides greater cutting face, extra compound-holding capacity.
- Ventilated steel center has rugged clamping teeth for safety.
- Available in standard sizes from 12 to 18 inches in diameter.

4 ROWS OF STRONG STITCHING

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TOP QUALITY BIAS-CUT SISAL

EXTRA FOLD FOR MORE BUFF FACE, GREATER COMPOUND RETENTION

EXTRA FOLD MEANS GREATER BUFF FACE, GREATER COMPOUND RETENTION

2 ROWS OF STITCHING FOR EXTRA FLEXIBILITY



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**313** 

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# METAL FINISHING

DEVOTED EXCLUSIVELY TO METALLIC SURFACE TREATMENTS

ESTABLISHED 1903

**VOLUME 54** 

NUMBER 6

JUNE, 1956

# Forty-Third in Washington

This is the last opportunity to remind our readers that the metal finishing highlight of the year is close at hand. We are referring, of course, to the annual convention of the *American Electroplaters' Society* which is being held on June 17-21 in Washington, D. C.

The educational program, which is always the ostensible reason, and sometimes the excuse, for attending any convention of this type, consists of some forty papers on metal finishing and related fields, a list of which appears in this issue of Metal Finishing. A glance at the roster of eminent authors and their subjects should be sufficient assurance that the previous high standards are being maintained, if not exceeded. There is no need to discourse on the obvious advantages to be derived from attending; the exchanges of ideas, the freshening of outlooks, and the other benefits of which even newcomers are well aware. One never leaves these meetings without feeling fully rewarded.

There will be no exposition and no formal manufacturers' exhibits but, since the nation's capital is the scene of this year's event, most visitors will probably be grateful for the additional time thus made available for sightseeing. All the important landmarks are within a stone's throw of headquarters and complete arrangements have been made for transportation and guided tours of the points of interest with which we have all been familiar since childhood, if only from picture and book.

An innovation this year, for which the thoughtfulness of the convention committee cannot be praised too highly, is the special arrangement for a children's program, which takes in all the sights and includes lunches during their tours. This observer does not intend to deprive his family of such an educational opportunity, and we are sure that many more conventioneers will also be quick to take advantage of this excellent feature.

Congratulations are in order for the various committees whose combined efforts have resulted in a program which does the A.E.S. proud. See you in Washington.

Nathamil Hall



## A. E. S. TO HOLD 43rd ANNUAL CONVENTION



### WASHINGTON, JUNE 17 - 20



Clyde Kelly Supreme President

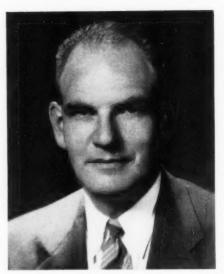
THE Baltimore-Washington Branch will sponsor the 43rd Annual Convention of the American Electroplaters' Society in Washington, June 17-21. Convention headquarters and most events will take place at the Statler Hotel, 16th and K Streets, with a few events and some of the attendance housed at the Mayflower Hotel a few blocks away on Connecticut Avenue. Both hotels are located in the heart of the nation's capital a few short blocks from the White House and

other important Government buildings.

Arthur G. Pierdon, with the Art Metal Finishing Company, is the general chairman with Kenneth M. Huston, of Armco Steel Corporation, assisting. Honorary Chairman is Dr. William Blum who acted as chairman of the previous A.E.S. Washington Convention in 1930. At that time and for many years, Dr. Blum was chief of the Electrodeposition Section of the Bureau of Standards, and he is coauthor with the late George P. Hogaboom of the book "Principles of Electroplating and Electroforming." This Standards Bureau post is now held by Dr. Abner Brenner who is chairman of the educational sessions at this Convention. An exceptionally fine program has been lined up. The abstracts of the papers appear elsewhere in this

The keynote speaker will be *Dr. Allen V. Astin*, director of the *National Bureau of Standards*, who will address the Monday morning opening session. Dr. Astin is nationally known in scientific circles.

A registration fee of \$20, will cover admission to the technical sessions and all social events. Registration will commence at the Statler Hotel on Sunday afternoon and evening, June 17th. This



Arthur G. Pierdon
Convention Chairman

year there will be no exhibits either of manufacturers' equipment and supplies or of plated finishes. Several interesting plant visitations are planned, plus an afternoon excursion to Mt. Vernon on Wednesday. There is also time provided for independent sight-seeing.

A feature of this year's convention is a children's program in addition to the customary ladies' program. Mary A. Pierdon is chairman of the Ladies' Committee.



Dr. Samuel Heiman 1st Vice-Pres.



Francis T. Eddy 2nd Vice-Pres.



Herbeth E. Head 3rd Vice-Pres.



Dr. Ralph Schaefer



Peter Kovatis Exec. Sec'y.



OF

Kenneth M. Huston Co-Chairman

# General Program

All events are scheduled at the Hotel Statler unless otherwise noted. Eastern Daylight Savings Time used throughout program.

Convention Registration in upper lobby on Mezzanine Floor.

Sunday, June 17 ... 1:00 p.m.-9:00 p.m. Monday, June 18 ... 9:00 a.m.-5:00 p.m. " " 8:30 p.m.-10:30 p.m. Tuesday, June 19 ... 9:00 a.m.-12:00 N. Wed., June 20 ...... 9:00 a.m.-1:30 p.m. Thursday, June 21 ... 9:00 a.m.-12:00 N.

The registration fee of \$20.00 for men and women and \$10.00 for children 16 and under provides each registrant with a book of tickets covering all events on each program.

Table reservations for the Banquet on Thursday, June 21, should be made in advance at the Banquet Reservation Desk in the upper lobby, starting Tuesday, June 19, at 9:00 a.m. Banquet tickets for children are not included in their registration ticket books. These may be purchased for \$7.00 additional, with their registration.

#### Sunday, June 17, 1956

10:00 a.m.

Massachusetts Room
A.E.S. Executive Board Meeting.

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8:00 p.m.

Federal and South American Rooms
A.E.S. Get Together Party. Light refreshments. Admission by ticket.

#### Monday, June 18, 1956

10:00 a.m.

PRESIDENTIAL ROOM

OPENING SESSION AND BUSINESS MEETING.

12:00 Noon

South American Room

METAL FINISHING SUPPLIERS' ASSOCIATION, Luncheon and meeting.

#### 12:00 Noon

CALIFORNIA ROOM

Branch Secretaries Luncheon.

Massachusetts Room

SPEAKERS LUNCHEON.

2:00 p.m.

PRESIDENTIAL ROOM

FIRST EDUCATIONAL SESSION A. Admission by badge,

CONGRESSIONAL ROOM

FIRST EDUCATIONAL SESSION B. Admission by badge.

2:30 p.m.

Massachusetts Room Editorial Board Meeting.



Dr. William Blum Honorary Chairman

6:30 p.m.

CALIFORNIA ROOM

PAST PRESIDENTS DINNER.

9:00 p.m.

PRESIDENTIAL AND CONGRESSIONAL ROOMS

Open House. All registrants will be guests of the Metal Finishing Suppliers' Association. Refreshments and dancing. Buffet served at 10:30 p.m. Admission by ticket.

#### Tuesday, June 19, 1956

8:00 a.m.

Оню Воом

SPEAKERS BREAKFAST.

9:00 a.m.

PRESIDENTIAL ROOM

Second Educational Session A. Admission by badge.

Congressional Room

SECOND EDUCATIONAL SESSION B. Admission by badge.

#### 12:00 Noon

Massachusetts Room

BRANCH LIBRARIANS LUNCHEON.

1:00 p.m.

Annual Golf Tournament, Metal Finishing Suppliers' Association. Manor Country Club Course, Norbeck, Maryland.

2:00 p.m.

Massachusetts Room

RESEARCH COMMITTEE MEETING

6:30 p.m.

NEW YORK ROOM

SPEAKERS DINNER

CONGRESSIONAL ROOM

THIRD EDUCATIONAL SESSION B. Admission by badge.

8:00 p.m.

PRESIDENTIAL ROOM

THIRD EDUCATIONAL SESSION A. Admission by badge.

Wednesday, June 20, 1956

8:00 a.m.

Оню Воом

SPEAKERS BREAKFAST

9:00 a.m.

PRESIDENTIAL ROOM

FOURTH EDUCATIONAL SESSION A. Admission by badge.

CONGRESSIONAL ROOM

FOURTH EDUCATIONAL SESSION B. Admission by badge.



Mrs. Arthur G. Pierdon Ladies Chairman



Dr. Abner Brenner Educational Chairman



Fielding Ogburn Registration Chairman



Dr. Vernon A. Lamb



Jules Horelick
Finance Chairman



Vincen J. Hughes, Jr.
Plant Visitation Chairman



T. R. Boggess Wendell P. Barrows
Transportation Chairman Entertainment Chairman



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Asaf A. Benderly Hotel Chairman

William Metzger, Jr.

#### 12:00 Noon

CALIFORNIA ROOM
MICHIGAN STATE ALUMNI LUNCHEON.

#### 1:00 p.m.

Trip to Mt. Vernon. Buses leave from 16th Street entrance to hotel, Admission by ticket.

#### 9:30 p.m.

PRESIDENTIAL AND CONGRESSIONAL ROOMS FLOOR SHOW AND DANCE, Admission by ticket.

#### Thursday, June 21, 1956

8:00 a.m.

Оню Воом

SPEAKERS BREAKFAST.

#### 9:00 a.m.

PRESIDENTIAL ROOM

FIFTH EDUCATIONAL SESSION A. Admission by badge.

CONGRESSIONAL ROOM
FIFTH EDUCATIONAL SESSION B. Admission
by badge.

#### 2:00 p.m.

FEDERAL ROOM

A.E.S. Business Meeting.

#### 7:00 p.m.

PRESIDENTIAL AND CONGRESSIONAL ROOMS

Annual Banquet. Admission by reservation ticket only. Your Registration Book ticket must be exchanged for a special Banquet ticket. Ticket exchange starts at 9:00 a.m. Tuesday, June 19, at Banquet Reservation Desk in upper lobby.

# Technical Program

#### Monday, June 18, 1956

2:00 p.m.

Session A. PRESIDENTIAL ROOM

#### Novel Applications of Plating

Chairman: Dr. E. R. Bowerman, Sylvania Electric Products, Inc.

- Some Recent Developments in Selective Localized Plating for Engineering Purposes. By Marv Rubinstein, Metal Finishing Consultant.
- Investigation and Evaluation of Plating Processes and Plate Combinations for Use on Etched Circuity. By E. H. Babcock, R. K. Stephens and R. C. Grinsinger, Convair.
- Overlay Plating of Steel Back Aluminum Lined Sleeve Bearings. By A. H. Beebe, B. F. Rothschild and G. J. LaBrasse, Federal Mogul Research and Development.
- The Protection of Molybdenum Against High Temperature Oxidation. By Julius J. Harwood, Office of Naval Research, Department of the Navy.

Session B. Congressional Room

#### Thickness and Distribution of Coatings

Chairman: Dr. R. B. Saltonstall, The Udylite Corporation.

- Gaging Thin Nickel Coatings by X-Ray Fluorescence. By W. W. Sellers and Kenneth Carroll, Research Laboratory, International Nickel Company, Inc.
- Measurement of the Thickness of Metallic Coatings by X-Ray. By Earl J. Serfass and Fred Achey, Lehigh University.
- Current Distribution of Microfiles, By D. Gardner Foulke and Otto Kardos, Hanson-Van Winkle-Munning Company.
- Leveling Definition, Measurement and Understanding. By J. D. Thomas, General Motors Corporation.

#### Tuesday, June 19, 1956

9:00 a.m.

Session A. PRESIDENTIAL ROOM

#### Physical and Mechanical Properties of Deposits

Chairman: Mr. J. Teres, Wright Air Development Center.

- Properties of Electro-deposits at Elevated Temperatures. By W. H. Sajranek and G. R. Schaer, Battelle Memorial Institute.
- Limitation of Plated Nickel in Jet Engine Design. By R. W. Moeller and W. A. Snell, Pratt and Whitney Aircraft.





Raymond Stricklen, Jr.
Publicity Chairman

Carl H. Thiede Program Chairman





Dr. E. R. Bowerman Session Chairman

Dr. R. B. Saltonstall
Session Chairman

- 3. Some Characteristics of Electroformed Iron Deposits, By A. M. Max, Radio Corporation of America, G. R. Van Houten, P. R. Mallory and Company.
- A Study of the Effect of Several Organic Addition Agents on the Hardness and Residual Stress in Nickel Deposits. By I. L. Newell, The Henry Souther Engineering Company.

Session B. CONGRESSIONAL ROOM

#### Analysis and Control

Chairman: Dr. Earl J. Serfass, Lehigh University.

- Spectrochemical Determination of Nickel in Bright Cadmium Plating Solution. By Morton Levy and Henry Friedenberg, Crobaugh Laboratories.
- Complete Polarographic Analysis of Cyanide Zinc Plating Baths. By Thomas H. Collard, Jr. and David K. H. Liu, Friedrich Refrigerators, Inc.
- 3. The Polarographic Determination of Cadmium and Cyanide in Alkaline Cadmium Plating Solutions. By G. T. Forsyth, Udylite Research Corporation.
- Hyperbolic Electroplating Cell. By R. F. Walton, Radio Corporation of America, and Dr. R. Gilmont, Manostat Corporation.

SESSION A. PRESIDENTIAL ROOM

8:00 p.m.

#### Equipment and Engineering

Chairman: Mr. L. F. Scott, United Chromium Corporation.

 Coated Abrasive Belts Speed Metal Working Production (motion picture in color). By E. E. Oathoat, Behr-Manning Coated Abrasives Division of Norten Company.

- Filter Media. By M. L. Whitehurst, Elmer Lundberg, Quentin O. Schockley, and John M. Hood, Indianapolis Branch of American Electroplaters' Society.
- Tank Linings. By Kenneth G. Le-Fevre, Metalweld, Inc.
- Plating Room Tank Ventilation Equipment, By F. W. Arndt, Heil Process Equipment Corporation.

Session B. Congressional Room

#### Protective Value and Related Properties of Coatings

Chairman: Mr. C. H. Sample, International Nickel Company.

- Radiographic Detection of Pores in Nickel Coatings. By Fielding Ogburn and Margaret Hilkert, National Bureau of Standards.
- The Permeation of Gases Through Electrolytic Nickel Deposits as Affected by Accelerated Corrosion. By J. Martin Tobin and D. Gardner Foulke, Hanson-Van Winkle-Munning Company.
- The Effect of Impurities and Purification of Electroplating Solution. I. Nickel Solutions.—D. T. Ewing, Mich. State;
   The Effects And Removal of Aluminum. D. T. Ewing, Michigan State U. and W. O. Dow, Jr., Sunbeam Corporation;
   The Effects of Manganese. By A. J. Smith, Michigan State University and R. J. Rowe, Dow Chemical Company.
- Progress Report on Accelerated Corrosion Tests for the Performance of Plated Coatings (AES Project 15). By W. L. Pinner, Houdaille-Hershey Corporation.



9:00 a.m.

Session A. Presidential Room

#### Alloy Plating

Chairman: Dr. W. A. Wesley, International Nickel Company.

- Electrodeposition of Porous Nickel-Cadmium Alloy. By L. D. McGraw, J. P. Spenard and C. L. Faust, Battelle Memorial Institute.
- Gold-Silver Alloy Plating. By A. G. Cafferty and R. E. Harr, Western Electric Company.
- Nickel-Iron Alloy Electro-deposits for Magnetic Shielding, By V. P. McConnell, I. W. Wolf, Electronics Division, General Electric Company.
- Improved Techniques for Electroless Nickel Plating on Non-conductors. By Harold Narcus, Electro-Chemical Industries, Inc.

Session B. Congressional Room

#### Three Different Coating Types. A Trilogy

Chairman: Mr. G. A. Lux, Oakite Products, Inc.

- Study of Phosphate Treatments for Metals. By Lloyd Gilbert, Rock Island Arsenal.
- Organic Finishes on Plated Products, By Gene L. Leithauser, Research Staff, General Motors Corporation.
- Electrodeposition of Antimony. By A. H. DuRose, Harshaw Chemical Company.
- Acceptance Sampling by Variables. A Tool for Decision. By Roger H. Moore, Los Alamos Scientific Laboratory.

#### Some Recent Developments in Selective, Localized Plating for Engineering Purposs

By Marv Rubinstein, Metal Finishing Consultant

trolytes. By Nelson F. Murphy and Arthur C. Doumas, Virginia Polytechnic

The Growth and Properties of Metal Whiskers, By S. M. Arnold, Bell Tele-

Study of Adhesion by the High Speed

Rotor Techniques, By J. W. Beams, De-

partment of Physics, Rouss Physical

Dissolved Gases in Plating Baths. By W. M. Tucker and F. O. Beuckman,

Abstracts

Laboratory, University of Virginia.

Institute. Blacksburg, Virginia.

phone Laboratories, Inc.

Eastman Kodak Company.

The operation formerly known as "brush" or "touch-up" plating has recently undergone a complete revolution. Primarily the paper covers techniques of operations including a description of a variety of engineering applications. The metallurgical properties of deposits obtained by such methods also receive some attention.

#### Investigation and Evaluation of Plating Processes and Plating Combinations for Use on Etched Circuitry

By E. H. Babcock, R. K. Stephens, and R. C. Grimsinger, Convair, Division of General Dynamics Corp.

This work covers the various processes, plating baths, and plate combinations proposed for use on etched circuitry fabricated from one and two side copper laminate glass epoxy board.



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J. Teres Session Chairman



Dr. Earl J. Serfass Session Chairman



L. F. Scott Session Chairman



C. H. Sample Session Chairman

#### Thursday, June 21, 1956

9:00 a.m.

Session A. PRESIDENTIAL ROOM

#### **Chromium Plating**

Chairman: Mr. Arthur Logozzo, Nutmeg Chrome Corporation.

- Chromium Plating on Gun Bores. By V. A. Lamb and J. P. Young, National Bureau of Standards.
- Hard Chrome Plating of Titanium Alloys. By L. Missel, Lockheed Aircraft Corporation.
- The Adhesion of Electroplated Coatings to Titanium. By Connie Stanley and Abner Brenner, National Bureau of Standards.
- Electroplating on Unusual Alloys. By Charles Levy, Watertown Arsenal.

Session B. CONGRESSIONAL ROOM

#### Basic Studies of Baths and Deposits

Chairman: Dr. William Blum.

1. Electrodeposition of Aluminum from Aluminum Chloride—Amine Ether Elec-



Dr. W. A. Wesley Session Chairman



G. A. Lux Session Chairman



Arthur Logozzo
Session Chairman



Dr. William Blum Session Chairman



Dr. D. Gardner Foulke

(



I. L. Newell



Henry R. Friedberg



Fielding Ogburn



Margaret Hilkert



W. L. Pinner

#### Overlay Plating of Steel-Back Aluminum-Lined Sleeve Bearings

By A. H. Beebe, Jr., B. G. Rothschild and G. J. LeBrasse, Federal-Mogul Division, Research and Development, Federal-Mogul-Bower Bearing, Inc.

One of the newer products in the sleeve bearing industry is the steel back—aluminum alloy lined bearing. This paper describes a method for electrodepositing a lead alloy overlay on such bearings.

#### The Protection of Molybdenum Against High Temperature Oxidation

By Julius J. Harwood, Head Metallurgy Branch, Office of Naval Research, Navy Department.

This paper reviews the status of the problem of the oxidation of molybdenum and attempts to summarize the research programs which have been underway for the development of protective coatings.

#### Coating Thickness Measurement by Filtered X-Ray Fluorescence

By Dr. Earl J. Serfass and Dr. Fred A. Achey, Department of Chemistry, Lehigh University

Using X-ray fluorescence methods, thickness of thin coatings can be determined by measuring either excitation of the substrate or the coating layer. The use of filters to measure characteristic X-ray fluorescence radiation is suggested as a method for quantitatively determining the thickness of thin coatings. The method involves excitation of both the coating and substrate with an incident X-ray beam, and subsequent measurement of only fluorescence from the coating. Easily prepared filters replace the usual collimator-crystal procedures.

#### Gaging Thin Nickel Coatings by X-Ray Fluorescence

By K. G. Carroll and W. W. Sellers, International Nickel Company, Inc., Research Laboratory

Electrodeposited nickel coatings ranging in thickness from 10 to 200 microinches may be accurately measured by means of characteristic X-rays generated in the coating. Suitable X-ray apparatus is described, and optimum conditions for X-ray excitation, dispersion, and detection are discussed. The non-destructive character of the measurements is important in many plating applications.

#### **Current Distribution of Microprofiles**

By Dr. D. Gardner Foulke and Dr. Otto Kardos, Hanson - Van Winkle · Munning Company

The characteristic dimensions of microprofiles are relatively small with respect to: (1) The product of the specific conductivity and the slope of the polarization curve. (2) The "effective thickness" of the diffusion layer. Criterion 1 alone would lead to uniform current distribution on microprofiles under most conditions. Criterion 2, however, serves to explain both leveling and microthrow as it implies that the "effective thickness" of the diffusion layer is smaller for the peak than for the recess. New experimental data are presented.

#### Leveling—Definition, Measurement, and Understanding

By J. D. Thomas, General Motors Corp.

Leveling is defined. The bases for plating are electroforms of standard ruled specimens in which the spacing, depth, and angle of rulings were varied in a controlled manner. The degree of leveling on the plated samples was studied by means of the Surfagage, Tallysurf, interference microscope, and by cross-sectioning. Experimental data show that organic addition agent combinations primarily, influence the leveling characteristics of bright nickel plating baths. Possible explanations of the mechanism of leveling are discussed.

#### Properties of Electrodeposits at Elevated Temperatures

By W. H. Safranek and G. R. Schaer, Battelle Memorial Institute

Elevated temperature properties including oxidation resistance in air and molybdenum oxide, stress rupture, thermal expansion, thermal stability, ductility, and hot hardness were determined for nickel, chromium, and other electrodeposits. The results of the research showed promising leads for developing improved electrodeposits for protecting molybdenum and other metals against oxidation at high temperatures.

#### Limitations of Plated Nickel in Jet Engine Design

By R. W. Moeller and W. A. Snell, Pratt and Whitney Aircraft

This paper presents in graphic form some of the factors which restrict the use of plated nickel on highly stressed jet engine parts. Residual stress vs. temperature, residual stress vs. fatigue life, plate thickness vs. corrosion resistance and production con-

trol variations are discussed, showing the limitations of nickel plated from the Watts' type, sulfamate, and electroless nickel solutions.

#### Some Characteristics of Electroformed Iron Deposits

By Dr. A. M. Max, RCA Victor Record Division and Dr. G. R. Van Houten, P. R. Mallory and Co.

Deposits from a typical iron chloride electroforming solution are investigated under a wide variety of deposition and solution variables. Cathode efficiency, deposit stress, tensile strength, and ductility as well as pitting are correlated with temperature, current density, acidity, ferric ion concentration and agitation. The importance of temperature is demonstrated and related to deposit stress.

#### A Study of the Effect of Several Organic Addition Agents on the Hardness and Residual Stress in Nickel Deposits

By I. L. Newell, Henry Souther Engineering Co.

No hard and ductile metals are available as electrodeposited coatings with low residual tensile stress or compressive stress. The sulfamate formulation for Ni deposits was chosen to be modified with several organic addition agents to increase the hardness and produce a compressively stressed electrodeposit. Three organic addition agents were chosen for test: saccharin, paratoluene sulfonamide and naphthalene 1, 3, 6 trisulfonic acid. The results obtained show a correlation between the temperature, current density, stress and hardness with varying amounts of the addition agent.

#### Coated Abrasive Belts Speed Metal Working Production

By E. E. Oathoat, Behr-Manning Coated Abrasives Div. of The Norton Company

A motion picture designed to show advantages offered by coated abrasive belts, their adaptability, and available machinery for mass production finishing.

#### Spectrochemical Determination of Nickel in Bright Cadmium Plating Solutions

By Henry R. Friedberg, Metal Finishing Consultant and Morton L. Levy, Laboratory Manager Crobaugh Laboratories

In the control of brightener additions to cadmium plating solutions it is important to determine the amount of nickel present in the bath. The relatively small amounts of nickel make the use of spectrochemical techniques attractive for speed, convenience, and accuracy. This paper describes the method selected and includes experimental data and analytical curves. A procedure for the preparation of standards is given.

#### Complete Polarographic Analysis of Cyanide Zinc Plating Baths

By T. H. Collard, Jr. and David K. H. Liu Friedrich Refrigerators, Inc.

A brief review of polarographic methods used, to date, in cyanide zinc plating bath analyses is given. A method developed as a part of a general study undertaken in the authors' laboratory is described. This new polarograph, based upon certain assumptions and using a modified, simpler and less expensive polarographic circuit, makes possible the determination of zinc, total sodium cyanide, caustic soda, and sedium carbonate.

#### Construction and Operating Characteristics of a New Electroplating Cell for Current Density Studies

By R. F. Walton, Radio Corporation of America and R. Gilmont, Manostat Corporation

A new type of electroplating cell, the "Hyperbolic Electroplating Cell" was developed. The hyperbolic cell was designed and constructed to conform to a predetermined geometrical pattern. Cell calibration curves were experimentally developed which help to establish a simple mathematical formula expressing the linear relationship between primary current density and distance measured along the cathode of the cell.

#### Filter Media

By Q. O. Shockley, M. L. Whitehurst, Elmer Lundberg, John Hood, Indianapolis Branch, American Electroplaters' Society

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The object of this paper is to collect and classify available information on filter media and present it as an aid in the selection of filter media for specific uses.

#### Rapid Analysis of Cyanide Plating Baths

By Dr. R. F. Muraca, Jet Propulsion Laboratories, California Institute of Technology

The development of a simple procedure for analyzing plating baths is described. The analysis can be carried out in the

plating shop within 10 minutes. The apparatus necessary for the analysis can be constructed by any machine shop and can be calibrated in the plating shop. The required reagents are generally available in the plating shop or can be purchased locally; furthermore, the concentrations of the reagents used in the analysis are not critical.

#### The Polaragraphic Determination of Cadmium and Cyanide in Alkaline Cadmium Plating Solutions

By G. T. Forsyth, The Udylite Research Corp.

A rapid polarographic method for the determination of cadmium and total cyanide in cadmium plating solutions is presented. Both cadmium and total cyanide can be determined in 10 to 15 minutes. Data comparing results obtained using the method described and a conventional method of analysis is given together with the required calibration curves and a sample polarogram.

#### Tank Linings

By Kenneth G. Le Fevre, Metalweld, Inc.

The paper begins with a general discussion of the lining and coating materials that have been used in pickling and plating tanks. Various coating and lining materials are covered including the more recent "Combination Coatings." Insofar as possible, the economics of various types, along with practical considerations such as repairs are discussed. Case studies are presented.

#### Plating Room Tank Ventilation Equipment

By F. W. Arndt, Chief Engineer, Heil Process Equipment Corp.

A brief discussion of the most important considerations for determining the exhaust volumes required for the various typical plating tanks is presented. With this as a basis, the paper is divided into five topics each being discussed mostly from a practical viewpoint: A) Hoods, B) Ducts, C) Fans, D) Fume Scrubbers, E) Stacks.

#### The Radiographic Detection of Pores in Plated Coatings

By Fielding Ogburn and Margaret Hilkert, National Bureau of Standards

Techniques for making radiographs of metal coatings plated adherently on steel or on a radioactive basis metal are described. Either a radioactive metal or an X-ray machine may be used as the radiation source. Means of greatly improving sensi-

tivity by use of microradiography are indicated.

#### The Permeation of Gases Through Electrolytic Nickel Deposits as Affected by Accelerated Corrosion

By Dr. J. Martin Tobin, General Electric Corp. and Dr. D. Gardner Foulke, Hanson-Van Winkle-Munning Company

The method for measuring the permeability of electrolytic nickel foils to gases and the "intrinsic" permeability of various nickel deposits as well as wrought nickel are discussed. Data on the initial permeability of nickel-chromium foils is reported. Induced permeability after corrosion in 10 per cent sulfuric acid is also reported as are the results of a study of effect of electrolytic corrosion, according to the Pinner-Pierce method.

#### Effect of Impurities and Purification of Electroplating Solutions 1. Nickel Solutions

9. The Effects and Removal of Aluminum (AES Project 5)

By Dr. D. T. Ewing and Dr. A. J. Smith, Michigan State University and Dr. W. O. Dow, Jr., Sunbeam Corporation

The effects of aluminum on the appearance, adhesion, ductility, salt spray corrosion resistance, hardness and throwing power on electrodeposited nickel were studied. Low and high pH Watts solutions were studied for effects on spray nickel deposits, organic and nickel-cobalt solutions for bright deposits.

#### Effect of Impurities and Purification of Electroplating Solutions 1. Nickel Solutions

10. The Effects and Removal of Manganese

By Dr. A. J. Smith, Michigan State University and Dr. R. J. Rowe, Dow Chemical Co.

The effects of margin of in solution in the physical properties of electrodeposited nickel were studied. As in trevious water solutions employed were 2.2 and 5.2 pH Watts organic, and nickel-cobalt. Concentrations up to 300 mg./l. showed no significant effect on any of the properties. Removal of manganese cannot be effected by either low current density electrolysis or high pH treatments.



C. Stanley



Dr. C. L. Faust



Lloyd Gilbert



Dr. Abner Brenner



A. H. Du Rose



Dr. Harold Narcus

#### Progress Report on Accelerated Corrosion Tests for the Performance of Plated Coatings

(AES Project 15)

By W. L. Pinner, Houdaille Industries, Inc.

The third report of the Project 15 Committee accounts for continuing work in an endeavor to produce a dependable reproducible corrosion test for plated coatings. The report considers in detail the intensified effort which has been expended on two tests selected from those listed in the last report and which give promise of being successful in their application.

#### Electrodeposition of Porous Nickel-Cadmium Alloy

By L. D. McGraw, J. P. Spenard, and Dr. C. L. Faust, Battelle Memorial Institute

Porous nickel-cadmium alloy plate was deposited from a sulfate-chloride bath. Porosity as high as 30 to 50 per cent was induced by a colloidal addition agent. Gelatin was added to control stress and nodulation up to thickness of about 0.015 inch. Plate composition could be controlled up to 5 per cent cadmium.

#### Gold-Silver Alloy Plating

By R. E. Harr and A. G. Cafferty, Western Electric Co., Inc.

This report covers investigations of gold silver alloy plating from a cyanide type solution. The investigation was conducted to develop a set of conditions which would produce an 8 per cent silver gold alloy and several sets of conditions which yield such an alloy are given.

#### Nickel-Iron Alloy Deposits for Magnetic Shielding

By V. P. McConnell and Dr. I. W. Wolf, General Electric Co.

This paper covers the development of nickel-iron deposits to obtain thicknesses of plate from .003 inch to .025 inch. The effects of metal ion concentration and the conditions necessary to arrive at a deposit of the greatest initial permeability are listed. The effects of organic addition agents to reduce brittleness are also covered.

#### Improved Techniques for Electroless Nickel Plating on Non-Conductors

By Dr. Harold Narcus, President and Technical Director Electrochemical Industries, Inc.

This paper describes new and improved techniques for depositing electroless nickel coatings on non-conductors specifically ceramics, glass and plastics. More rapid and complete coverage of the non-conductive surface and greater adhesion of the nickel deposit to that surface result from employment of "de-polarizing," "sensitizing" and "activating" techniques which have been evaluated fully in many diversified industries.

#### Study of Phosphate Treatments for Metals

By Lloyd Gilbert, Rock Island Arsenal

This paper covers the actual formulation of the phosphate coating chemicals and the

functions of the individual components of the bath. The erratic corrosion behavior of the phosphate coatings is explained. A theory concerning the proper approach to improving the quality of phosphate coatings is presented as a conclusion drawn from the data presented.

#### Organic Finishes on Plated Products

By Gene L. Leithauser, Research Staff General Motors Corporation

This report covers factors affecting the adhesion of organic finishes to plated parts. This will include plating procedures as well as post-plating procedures that influence the durability of the organic finish. Pre-paint methods, chemical treatments on chromium plate, and use of primers is covered. Durability of pigmented and clear finishes over plated parts are also discussed, Evaluation methods and results of surveys of durability are included.

#### Some Notes on the Electrodeposition of Antimony

By A. H. Du Rose, Harshaw Chemical Co.

The results reported are a summary of an experimental survey made to determine the properties of electrodeposited antimony as a decorative and protective coating. The outstanding property of antimony is its lack of ductility or cohesive strength. In spite of this, good but not consistently reproducible corrosion protection was obtained. There appears to be some relation between adhesion and the respective orientations of the substrate and deposit.

#### A Tool for Decision—Acceptance Sampling by Variables and How it Works

By Roger H. Moore, Los Alamos Scientific Laboratory

This paper describes acceptance sampling by variable which is a set of rules for deciding whether or not a lot of production pieces is acceptable under specification limits. The effectiveness of the set of rules is measured by the shape of an operating characteristic curve which gives the probability of accepting a lot if it has a certain proportion of defective parts in it.

#### **Chromium Plating of Gun Bores**

By Dr. V. A. Lamb and J. P. Young, National Bureau of Standards

This paper describes the history of gun barrel plating prior to World War II, and since that period. The physical and chemical properties required of a gun bore coating are outlined, and the degree to which chromium and other metals meet these requirements is indicated. Methods for applying chromium electrodeposits to gun bores are described. Electropolishing of gun bores is also described.

#### The Adhesion of Electroplated Coatings to Titanium

By C. Stanley and Dr. Abner Brenner National Bureau of Standards

Good adhesion of electrodeposited coating to titanium is prevented by an oxide

film. A pretreatment for circumventing this difficulty was developed which involved the formation of a titanium fluoride coating by an electrolytic treatment in a solution of hydrofluoric and acetic acids.

#### Hard Chrome Plating of Titanium Alloys

By L. Missel, Lockheed Aircraft Corporation

Highly adherent chromium has been applied to several titanium alloys by electroplating. The process consists of an immersion treatment in a simple aqueous bath followed by plating in a conventional sulfate bath. A simple semi-quantitative plate adhesion-bearing property evaluation test has been developed.

#### Electroplating Chromium on Unusual Alloys

By Charles Levy, Watertown Arsenal

By variations in pretreatments, chromium has been electrodeposited from a conventional bath on some unusual alloys. Included among the basis metals were high-cobalt alloys, such as Stellite 21, S-816 and V-36; high nickel alloys, such as Hastalloy B, Hastalloy C and Inconel X; molybdenum; and stainless steels, such as 502 and 19-9DL. Chromium plated AISI 4340 steel was used for comparison purposes. A nickel chloride-hydrochloric acid electrolytic treatment applied prior to chromium plating was the principal means by which sound deposits with good adhesion were achieved.

#### A New Organo-Aluminum Chloride Bath for Deposition of Aluminum

By Dr. Nelson F. Murphy and Dr. Arthur C. Doumas, Virginia Polytechnic Institute

A new electrolyte for the deposition of aluminum, consisting of a solution of aluminum chloride in ether and substituted amine, is described. The limitations of operating conditions are given. The deposits are adherent, can be made of considerable thickness and may be polished. Bright deposits have been obtained from the bath at high current densities.

#### The Growth and Properties of Metal Whiskers

Laboratories, Inc.

An account of studies at Bell Telephone Laboratories following the discovery that failure of certain electrical equipment was a result of the presence on a metal surface of a number of microscopic filaments. The filaments or "whiskers" were found to be metal single crystals possessing unique properties. These unusual properties are attributed to a perfection of structure not found in bulk material, and hence are of interest in fundamental studies of the metallic state.

#### Study of Adhesion by the High Speed Roto Technique

By Dr. J. W. Beams, Department of Physics, University of Virginia

If films of a material are uniformly deposited on the peripheries of cylindrical (Continued on page 74K)

# N. A. M. F. Program

The National Association of Metal Finishers has announced that it will hold its annual meeting and the fifth management seminar on Sunday and Monday, June 17-18, 1956, at the Mayflower Hotel, Washington, D. C. The meetings are being held in conjunction with the Annual Convention of the A.E.S.

The annual meeting of the membership at 9:00 A.M. on Sunday, will be followed on Monday by the all-day management seminar, during which four sessions and a banquet are scheduled, with talks on topics of interest to the owners and operators of job-shop metal finishing companies and the managers of finishing departments of manufacturing plants.

Included in the sessions starting at 1:00 P.M.. June 18th, will be the subject of Waste Disposal Legislation, by William Acks, assistant general manager, Bechtel-McLaughlin Corp., Sandusky, Ohio; Labor Relations Problems, by Robert L. Giesel, president, Adolph Plating, Inc., Chicago, Ill.; Work Simplification for the Job-Shop. by S. J. Fecht, president, S. J. Fecht & Associates, Chicago and New York: and General Shop Operating Problems by Silvio C. Taormina, director, Platers Technical Service, New York and Chicago, and technical advisor to the Association.

Beginning at 6:30 P.M., the group



Typical Scene in Washington



The Mayflower Hotel

will assemble for cocktails and dinner, at which time the key speaker will be a representative of small business interests in Congress. Subject of the Congressman's talk will be the current shortage of nickel metal, and the relationship between Congress and small business.

John Palik, Jr., president of National Plating Corp., Cleveland, Ohio, and the Association's president, has announced that the registration fee for the seminar, including cocktails and dinner, will be \$10.00 per person.



The Hotel Statler

# Children's Program

Sunday, June 17, 1956

8:00 p.m.

Get Together Party Hotel Statler—Federal & South American Rooms— Admission by ticket.

#### Monday, June 18, 1956

11:00 a.m. to 4:00 p.m.

SIGHTSEEING

Bus: Hotel Statler—16th St. Entrance National Zoological Park Lunch Smithsonian Institute & Museum of Natural History Use ticket in book.

9:00 p.m.

Metal Finishing Suppliers Association Open House Admission by ticket.

#### Tuesday, June 19, 1956

10:00 a.m. to 4:00 p.m.

SIGHTSEEING

Bus: Hotel Statler—16th St. Entrance Washington Monument U. S. Capitol (Guided Tour) Federal Bureau of Investigation Trip through Potomac Park Use ticket in book.

#### Wednesday, June 20, 1956

1:00 p.m.

Trip to Mt. Vernon
Bus: Hotel Statler—16th St. Entrance
See Changing of the Guard at the Tomb
of the Unknown Soldier
Ride Through Old Alexandria
Visit Mt. Vernon
Enjoy a boat ride on historic Potomac River
Use tickets as marked.
9:30 p.m.
Floor Show

Admission by ticket.

#### Thursday, June 21, 1956

10:00 a.m. to 4:00 p.m.

SIGHTSEEING

Bus: Hotel Statler—16th St. Entrance White House Bureau of Printing & Engraving Lincoln Memorial Lunch Washington National Airport Use ticket in book.

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#### LADIES PROGRAM Sunday, June 17, 1956

8:00 p.m.

FEDERAL & SOUTH AMERICAN ROOMS

GET TOGETHER PARTY. This is the time and place to greet your old friends and to make new ones. Come one, come all! Refreshments. Admission by ticket.

#### Monday, June 18, 1956 10:00 a.m.

PRESIDENTIAL BALLROOM

Opening Session. Ladies, see your men off to a good start for a successful Convention! Hear Dr. Allen V. Astin of the National Bureau of Standards deliver the keynote address.

#### 12:00 Noon

WILLARD HOTEL, GRAND BALLROOM

LUNCHEON. Meet with the Ladies Committee for luncheon in the newly decorated Grand Ballroom of Washington's most historic hotel, THE WILLARD. Here Presidents have resided, the great have registered, historical decisions have been made, and all are graciously received. Admission by ticket.







Mrs. Loretta Huston Chairman Udylite Luncheon

2:00 p.m.

F STREET ENTRANCE - WILLARD HOTEL

WASHINGTON TOUR. Get a bird's eye view of your Nation's Capital. Bus Ticket in

9:00 p.m.

PRESIDENTIAL AND CONGRESSIONAL ROOMS

METAL FINISHING SUPPLIERS' ASSOCIATION

OPEN HOUSE. Fellowship, refreshments,

and dancing will make a long-to-be-re-

membered evening. Buffet supper at 10:30.

Tuesday, June 19, 1956

12:00 Noon

TERRACE DINING ROOM, NATIONAL AIRPORT

THE AUNT ELLA SOCIETY LUNCHEON, spon-

sored by Oakite Products, Inc. awaits you.

Dave Clarin, our genial host, makes it a

delightful party in a most unusual set-

Wednesday, June 20, 1956

1:00 p.m.

16TH ST. ENTRANCE - HOTEL STATLER

TRIP TO MT. VERNON. Buses leave from the

16th St. entrance of the Hotel Statler.

This is your opportunity to see the Chang-

ing of the Guard at the Tomb of the

Unknown Soldier, to ride through Old

Alexandria, to visit Mt. Vernon, and to

enjoy a beautiful boat ride on historic

Potomac River. Use tickets as marked.

9:30 p.m.

PRESIDENTIAL AND CONCRESSIONAL ROOMS
FLOOR SHOW AND DANCE. A gala evening of

fun and dancing is in store for you. Don't

Thursday, June 21, 1956

12:00 Noon

GRAND BALLROOM - MAYFLOWER HOTEL

LUNCHEON. The Udylite Corporation enter-

miss it. Admission by ticket.

ting. Admission by ticket.

Door prizes. Admission by ticket.

Ladies Book.



Mrs. Gladys Scott

Chairman

Oakite Party

tains you. Our host, Dr. Richard Saltonstall, will conduct the ladies' "Educational Session." He will discuss "What the Quality of Plating Means to You." Admission by ticket.

#### 2:00 p.m.

MAYFLOWER HOTEL - GRAND BALLROOM

PLATO PARTY. Is this your lucky day? Mrs. Joan Wiarda, our Guest Hostess with the mostest, provides an afternoon of fun. There will be fabulous prizes galore. Admission by ticket. Before leaving you will receive: 1) orchids from the Rapid Electric Co.; 2) ladies gift from the Baltimore-Washington Branch. Use tickets in book.

#### 7:00 p.m.

PRESIDENTIAL AND CONCRESSIONAL ROOMS

Annual Banquet — Dancing, A grand climax for your Washington visit! Be sure to change your Banquet Ticket for a table reservation. Prizes and awards will be made this evening.

The Washington Tour at 2:00 p.m. on Monday will give the Ladies an all over look at the beauties of Washington. Optional tours have been arranged which will allow more time for seeing individual features of the city.

# OPTIONAL TOURS Tuesday, June 19, 1956

8:30 a.m.

OPTIONAL SIGHTSEEING TRIP. Tour B, interior of Public Buildings. Price \$2.00.

Tickets may be purchased at Registration

Desk

#### Wednesday, June 20, 1956 8:30 a.m.

OPTIONAL SIGHTSEEING TRIP. Tour E, Shrines and Cathedrals. Price \$2.00. Tickets may be purchased at Registration Desk.

Tickets for these trips will be available on the preceding day to enable us to order



Mrs. Mabel Barrows
Chairman
Ladies' Luncheon





# Sightseeing in Washington

The Convention Committee has planned a wide variety of entertainment features in which a number of tours are included. However, many of the visitors may want to get a better look at some of the points of interest or may wish to stay over a day or two. For these several "Tabulated Tours" have been planned. Each one takes about a day. Copies will be available at the Convention Registration Desk in the Statler.

#### TOUR NO. 1

#### Library of Congress

One of the largest libraries in the world. First draft of Gettysburg Address; Gutenberg Bible; Miscellaneous — Historical Papers.

No. 40 Lincoln Park car from K & Con-

#### Folger Shakespeare Library

Collection of Shakespeareana and Elizabethan Theater.

Cross street from Library of Congress.

#### The Capitol

Guided tours every 15 min. 25c. To see Congress in session, obtain pass from your senator or representative. Any Capitol Guard can tell you when he is in town.

Walk 1 block.

#### Senate Office Bldg.

Subway from sub-basement in North wing of Capitol.

#### **Botanical Gardens**

Large collection of rare plants and flowers.

Walk to South-West corner of Capitol Grounds.

#### Department of Justice

FBI tours, 9:30 to 4:00

Walk west on Pennsylvania Avenue to 9th

#### Archives Building

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Declaration of Independence. The Constitution,

Walk west on Pennsylvania Avenue to 13th Street.

#### Department of Commerce Building

Continuous statistical recording machine for births and deaths. Aquarium.

Walk west on Pennsylvania Avenue to 14th Street.

#### Pan American Union Building

Patio with Aztec & Mayan motif; banana, coffee, rubber, and papaya trees. Exhibits of South American Craftsmanship.

Walk South to Constitutions Avenue and West to 17th St.

Return to Statler by R-4 Farragut Square bus from 18th and Constitution.

#### TOUR NO. 2

#### **Smithsonian Institution**

Gigantic and intriguing collection of everything pertaining to the social and industrial history of the country.

S-2, Federal Triangle bus from 16th and K.

#### Mount Vernon

Estate of George Washington.

A. B. & W. bus from 12th and Pennsylvania.

#### Tidal Basin & East Potomac Park

Cherry Blossoms (in April) Jefferson Memerial.

Taxi ride returning to hotel from bus terminal after return from Mt. Vernon.

#### TOUR NO. 3

#### National Presbyterian Church (if in town on a Sunday)

President attends 9:00 A.M. Service when he is in town.

Taxi to Connecticut Avenue and H St. (60c).

#### National Zoological Park

1,800 acre woodland setting for one of the finest zoos in the country.

Taxi (60c).

#### Washington Monument

View of District of Columbia, Maryland, & Virginia from 500 ft. height.

From Zoo take L2 or L4 bus to 14th & K; transfer to 50 or 54 streetcar and get off at 14th & Constitution.

#### Washington Waterfront Maine Avenue

Sea Food Restaurants. Herzog's, Hogate's Naylor's, New England.

Taxi from Washington Monument.

#### National Gallery of Art

Collection of some of the world's most famous paintings. Concerts at 8:00 P.M. on Sunday.

Taxi from Waterfront.

#### TOUR NO. 4

#### Bureau of Engraving

Printing of currency. Free guided tours 8 to 11 A.M. & 12:30 to 2 P.M.

Bureau of Engraving streetcar from 14th & K to end of line.

#### Supreme Court Bldg

Court sessions open to public at 11:00 A.M. Free Guided tours of building.

Taxi from Bureau of Engraving.

#### **Arlington Cemetery**

Tomb of Unknown Soldier and frequent military funerals.

Taxi from Supreme Court to Lincoln Memorial and Arnold bus to cemetery entrance.

#### Georgetown section of Washington

Little changed from early years. Called the most beautiful section of Wash. Antique Row of Wisconsin Ave. Georgetown University.

No. 4 Arnold bus from Arlington to Rosslyn, Va. Navy Yard streetcar to 31st & M Sts.

#### TOUR NO. 5

#### White House

Guided tour through rooms open to the public.

Walk from Statler, South on 16th Street.

#### Corcoran Gallery

Collections of paintings by American and European artists.

Walk from White House to 17th & E.

#### Freer Art Gallery

Whistler Collection and Chinese art.

Taxi from Corcoran.

#### Ford's Theater

Lincoln Museum.

Taxi.

#### **Shopping District**

Hecht's, Kann's & Lansburgh's at 7th & F Woodward and Lothrop at 10th & F and Garfinckel's at 14th & F.

Walk from Lincoln Museum.

#### **ABSTRACTS**

(Continued from page 74H)

rotors having different radii and the rotor speeds are increased until the material is thrown off, both the tensile strength and the adhesion to the rotor surface of the material may be determined. If the material is deposited on a rotor in circumferentially disconnected patches, the absolute value of the adhesion can be obtained directly. The techniques of spinning magnetically supended rotors in a vacuum is described and its application to the measurement of the adhesion of electrodeposited and evaporated metals on rotor surfaces is discussed.

#### Dissolved Gases in Plating Baths

By W. M. Tucker and F. O. Beuckman, Eastman Kodak Co.

It was found that a Watts nickel bath in good operating condition, when properly degassed, would yield pit-free deposits until it became saturated with a gas or gases at the temperature of operation. A suitable device ready made was found in the Van-Slyke Blood-Gas apparatus. Using the Van-Slyke Blood-Gas apparatus equilibrium studies indicate the limits of this approach and confirm the conditions which will produce pit-free deposits.

## METAL FINISHING SUPPLIERS ASSOCIATION PROGRAM



Herman Struckhoff

President, Metal Finishing Suppliers Ass'n

At noon on Monday, June 18, a luncheon and meeting will be held at the South American Room. Representatives of supply houses and all firms selling to the metal finishing field are urged to have someone present for the meeting. What better opportunity for a friendly and informal gathering with other suppliers, where mutual problems can be discussed? Immediately following the luncheon a business meeting will be held, at which time the election of officers will take place.

All those who have attended previous conventions will be looking forward to the gala Open House sponsored by the MFSA at 9 P.M. on Monday evening, June 18, at the Presidential and Congressional Rooms.

So end the MFSA activities during convention week. We trust that the rest of your stay in Washington, D. C. will be pleasant, and that you will have enjoyed the activities we shared.

It is with deep regret that we report on the death of Wilfred S. McKeon, one of the founders and a past president of the International Fellowship Club.

Born in Scottdale, Pa., he lived for 35 years in Greensburg, where he was president of the Sulphur Products Co.

Wilfred, who was also a charter member of the American Electroplaters' Society, Pittsburgh Branch, is survived by his wife Alma of 432 Greene St., Greensburg, Pa. and his sister. He will be missed by his many friends.



Joe Duffy 1st Vice-Pres.



M. M. Beckwith 2nd Vice-Pres.



Earl W. Couch 3rd Vice-Pres.



Tom Trumbour



A. P. Munning Secretary

A S convention time rolls around once again we look forward to the privilege and pleasure of entertaining all the old friends of the *Metal Finishing Suppliers' Association*, and making many new ones, too. This growing and increasingly active trade association, composed of the industry's manufacturers and distributors, will play its customary roll in the convention activities.

All the Association's meetings will take place at the Statler Hotel during the week of June 17. The Trustees' Meeting will be held on Sunday, June 17, from 2 P.M. to 5 P.M. All chairmen of committees and sub-committees are invited.

This event is always a "must" and is one of the social highlights of the week. All registrants are the guests of the Association, and can be assured a very pleasant evening of dancing, gay reunions, new friendships, and of course refreshments and a buffet at 10:30 P.M.

The other social activity of the MFSA is the annual Golf Tournament, which grows more and more popular each year, As in the past, golfers are urged to bring their clubs, shoes and handicaps—every one has a chance to win. The tournament, in the capable hands of our perennial Golf Chairman, Joe Duffy, will be held at the Manor Country Club Course in Norbeck, Md. on Tuesday, June 19, at 1 P.M.



Wilfred S. McKeon

# Cost Factors Governing Buff Selection

By Edwin Doyle, Barker Bros., Inc., Brooklyn, N. Y.

S AVINGS that can be made in the buffing department are often surprisingly out of proportion to the money spent on buffs and compound. Purchasing agents and other personnel responsible for selection of finishing supplies often are not aware that buffs and compounds account for a very small percentage of the finishing cost. In many cases this runs under five percent. Also omitted from consideration or considered only superficially is the fact that the buff is a tool and a very important tool. With this tool the surface of the metal is mechanically altered from a dull scratchy surface to a surface with a bright appealing finish. This tool should be selected with care and the right one picked to do the job with the least overall cost. If you give a carpenter a tack hammer to nail up rafters or a sledge for putting up trim, you are sure to get a poor and costly job. This may sound like a ridiculous comparison but every day there are thousands of tack hammer buffs trying to do sledge hammer jobs.

In order to arrive at a true basis for making buff selections, we must first consider the many factors that go into the total buffing cost. Pre-conceived values should be forgotten until all cost factors are considered and realistic values assigned to each. Following is a list of cost factors found in almost every buffing operation. They are purposely not listed in any order of comparative value. Since we are concerned with selection of the best buff and, of course, its counterpart in compound, we must only consider the portion of these cost factors that would be effected by the buff

performance.

Labor cost
Compound cost
Buff cost
Power cost
Machine-down time
Set-up time
Break-in time
Machine depreciation (include exhaust system)
Fixed overhead (rent, light, heat)
Cost of salvaging rejects
(careful, this may be a sleeper)

Supervision cost Maintenance cost

#### **Primary Cost Factors**

The labor considered should be only that which is connected with the actual buffing operation. Stock clerks and floor help, while contributing to the total cost, are in proportion to the volume being produced and the cost per unit finished should remain constant.

Compound and buff costs should be the actual cost of both items delivered to the buffing room but not set up on the machine.

Power cost would include the cost of electricity per

unit buffed. Compressed air used on automatic or semiautomatic set-ups would be constant per unit finished.

Machine-down time is that period when a machine is not producing. This, exclusive of labor, has a definite bearing on the overall cost and can be influenced by the selection of buffs. If a wheel has to be replaced three times a week instead of twice a week, the machine is idle 50% more of the work week.

Set-up time includes labor for removing the old wheel and setting up the new wheel. It may vary considerably depending on the kind of buff selected. The cost divided by the number of units buffed per set will give the unit cost. Naturally, the more pieces buffed, the lower the unit cost.

Break-in time is the time required after the new wheel is set up and started until the buff is producing properly, giving the desired finish in the minimum time. This will vary considerably, of course, depending on the job and the buff. It may take as little as twenty minutes to fully break in or as much as three or four hours on semiautomatic machines where a wheel has to form to the contour of the work. On automatic equipment, where the buff does not have to form a contour, it may still be close to two hours before the compound has worked down into the buff fabric sufficiently to form a satisfactory "head." During this breaking-in time, the labor cost will be higher and the rate of rejects may be especially high.

The costs resulting from machine-down time, set-up time and break-in time, may vary from 10% to as much as 100% of the cost of the buffing wheel. Considered properly these costs may have a big influence on buff selection.

Machine depreciation, as such, can be obtained quite easily and is usually quite small for hand buffing operations. On the other hand, when considering automatic equipment, it may be a very large factor. Very important, in the present expanding economy, is the fact that selection of the best buff for the job may eliminate the necessity of purchasing another piece of equipment. This was illustrated very recently by a manufacturer of electrical appliances working a double shift in the buffing room. A new line made it evident that work must be contracted out or additional equipment obtained. Complicating the problem was an already crowded factory with no room available for more equipment. By changing the selection of buffs, increasing the speed of the lathes and increasing the horsepower of the lathes, the semi-automatics were able to turn out the additional production with ease.

This example could also be used to illustrate the relationship of fixed overhead to the unit cost. Included here should be the rent for the floor space necessary for the buffing department. A figure including light and heat can easily be determined and should be broken

down on a square foot basis. A certain number of square feet can then be apportioned to each piece of equipment, thereby giving the cost per machine. This in turn can be broken down further by using the number of finished pieces which come off the machine.

The cost of salvaging rejected work may result in needless expense which can equal and exceed the cost of the buff. Very often the work has gone on to assembly, has had additional labor operations, or has been plated. The cost, together with the cost of preparing the part to be buffed again, must be considered. This is a cost that is definitely influenced by buff selection. A manufacturer of flash lights reports a \$25,000 saving on rejects. A manufacturer of deep drawn aluminum shells calculated a reduction of \$20,000 a year in cost by eliminating reworks. Both were done by a change in buffs used. Many other manufacturers report appreciable savings but don't attempt to give estimates.

Supervision costs tie in closely with labor costs. Even more important is the fact that industry, in general, is troubled by a lack of sufficiently trained supervisory personnel. If increased production per supervisor can be effected, it has accomplished more than the tangible saving in dollars,

Maintenance costs are usually affected by the number of machines rather than the number of parts produced. Therefore, an increase in the number of finished pieces coming off a machine will decrease the unit cost for maintenance.

These are the primary cost factors to be considered in the selection of buffs. Certain shops may add other items. Many shops will claim that it is impossible, with the quantities of work coming through, to determine these costs on an actual basis. This may be true in varying degrees but many can be broken down on a broader basis. Definitely, regardless of size or type of the buffing operation, these factors should be set down in some way and given a definite value. They should be converted to percentages of the overall buffing cost and, from this, the importance of each cost can be considered in relation to the overall cost and the other individual costs.

We have now a list of costs related to one another and to the overall cost. On this list there are two items

TABLE I

	Expenditures Per Month	Percent of Total
Buffs	\$ 3,000	6.9%
Compound, belts, other supplies	4,000	9.2%
Production labor (including floor help)	16,000	36.8%
Foreman, Set up, Supervis- ory, & Repair Labor	1,800	4.1%
Subtotal	24,800	
75% of above to cover general overhead	18,600	43.0%
Total	\$43,400	100%

(The above figures are rounded out for easy comparison.)

which will influence all the rest of the costs. These are the buff and the compound.

#### **Buffs and Compounds**

Table I lists a monthly breakdown given on the overall buffing operation by the manufacturer of a line of small appliances. Some of the costs listed above have been grouped together and added as general overhead.

This breakdown is made on a monthly basis, not to show costs on an individual job but to illustrate how the relative costs may compare. If we broke this cost down for individual jobs, we would have to break up the overhead into its component parts.

Using this example as a guide, one can quickly make a broad breakdown of his polishing operation. Take a year's bills and the cost of buffs and compounds will be found in several minutes. Check payroll books, time books or even the yearly summary compiled for withholding tax records. Most companies can easily determine the labor that should be charged to the polishing operation. If the average number of employees and the average wage are known, one can estimate close enough. Supervisory costs, may be known without looking them up, but if not, can be found promptly.

All that remains is overhead. The firm's accountant can provide this figure or a percentage to work from.

With a breakdown available on the cost factors of the buffing operation, selection of buff and compound becomes a matter of finding the lowest overall cost. The buff should be selected first and then the compound best suited for the operation determined.

How to select the best buff for the job? Find out which of the representatives who call from the buff companies and compound manufacturers know their business. Some representatives know their business well, some aren't too experienced but can bring an expert in from the factory. Still other manufacturers make no effort and are not qualified to help at all. Since keeping the customer informed on up-to-date practices is a very important part of the service, this latter group should be discouraged. Make them come up with information and provide this service or they have no place in today's economy. The days of the "good fellow" salesmen and the "peddler" are fading as more and more customers are demanding technical service.

Talk to the representatives who are qualified, have them talk to the methods man or the finishing superintendent. Discuss the job in question, get their suggestions, discuss the present method of doing it. If there are suggestions to be made, the more information that you can give the salesman, the more chance he has of coming up with an improvement. It is a never ending process but will result in worthwhile savings.

In conclusion, it may be interesting to note that the manufacturer whose breakdown is listed above, recently made a change in the selection of buffs used for one of their major buffing operations. This change resulted in a saving of just over three per cent in the total cost. This amounted to a saving of \$1300 per month which is a substantial saving in any company. It certainly is worthwhile to consider again the many cost factors governing buff selection and review operations with these costs in mind.

# VENTILATION

By J. B. Mohler

If a man burns rubbish in his own yard he will tolerate a lot of smoke. If his neighbor burns rubbish he may be much more sensitive to the foreign smoke that drifts over his property. Vagrant fumes give rise to much unpleasantness, whether they be in or out of a plant. In one case, a plant worker was removed from a work area on a stretcher due to the mere presence of a tank of cold sulfuric acid. This later proved to be an attack of appendicitis but, in the meantime, local excitement rose almost to hysteria over a tank that could put nothing more than water vapor into the air. This psychological factor cannot be ignored and, when odors can be detected or become obnoxious, education alone will not solve the problem.

Strangely enough, like the man and the rubbish, a worker in his own department will often tolerate unpleasantness that is unacceptable to others. This is because it is a part of his job and he has learned that discomfort does not necessarily mean that the condition is unhealthy. For the worker within a processing area it is not only desirable but mandatory to provide safe working conditions.

It is to be expected that air conditioning for a plating room will not be equal to that for an accounting department. The attempt to maintain maximum comfort in terms of heat, humidity, and moving air, would lead to unnecessary expense. The experienced plater will accept working conditions that assure safety and sufficient comfort for continuous exposure.

The ventilation problem in the plating room is to maintain toxic vapors, gases, mists, and spray at safe levels and to provide comfortable working conditions. A problem may exist for the surrounding areas within and outside the plant. Even though safety prevails, the possibility of complaints cannot be ignored. However, complete comfort at excessive expense should not be expected. Ventilation engineering is the economic answer to the problem.

#### Selection of Chemicals

Hazards are a part of living. The construction worker who falls from a bridge is just as dead as the man who receives a fatal dose of cyanide. Nevertheless, it is good practice to consider reducing the incidence of hazards.

Hydrochloric acid should never be used if sulfuric acid will work just as well. Not only is sulfuric acid cheaper, but the fume problem is considerably less. On the other hand, hydrochloric acid would be preferred to the more toxic fumes of nitric acid. Finally, almost any combination of acids is preferred to hydrofluoric. It would be more to the point to refer to hydrofluoric acid as poisonous rather than toxic. Perhaps the fumes of hydrofluoric acid may not fall in a general toxic category, but painful slow healing poisonous burns are best avoided by avoiding the use of the acid entirely.

The possibility of the generation of hydrogen cyanide gas by mixing of acids and cyanides should, of course, be kept in mind as the number one safety problem in any plating room.

Formic acid is relatively toxic in concentrated form, but this is an unlikely hazard, since the vapor pressure is relatively low. Phosphoric, acetic, oxalic, fluoboric, tartaric, citric, and sulfamic acids are relatively safe. Chlorinated solvents are toxic in sufficient concentrations.

Toxic and irritating spray from electrolysis of strong chemicals of any sort should be carried off by proper ventilation. Strong acids and alkalis will irritate the respiratory system, whereas chromic acid and cyanides may cause ulceration of the nasal passages.

A chemical solution to the ventilation problem should not be overlooked. An insistent safety directory, with a knowledge of toxicity but no knowledge of chemistry, has provided the incentive for the change of more than one hazardous process.

#### The Engineering Problem

The ventilation engineer will base a design on a fixed process. His basic problem is to supply drawings for equipment to move sufficient air over an area to carry away objectionable air-borne contaminants. If the air is exhausted from the room, a satisfactory means for inlet air must be provided and, during cold weather, incoming air must be heated. Air movement over hot tanks will increase evaporation rates so that hot ventilated tanks require a greater heat input than non-ventilated tanks.

The air that is moved must be of sufficient volume to maintain a low concentration of contaminants, and exhausted outside in such a manner that it will not pollute the immediate vicinity. To accomplish this it may be necessary to disperse or remove spray from the air stream. Nitric and hydrochloric acid sprays that are exhausted outside will evaporate although, in sufficient concentration, they are highly corrosive. Sulfuric acid, on the other hand, will concentrate by evaporation of water and become corrosive on contact.

High humidity and corrosive gases within the plant must be avoided. Water from humid air will condense on water lines or other cold surfaces and may drip on finished work. Small concentrations of hydrochloric acid gas in the air, that are not otherwise objectionable will activate finished steel surfaces and promote rusting, especially on humid days.

#### The Economic Problem

Even though good ventilation may pay for itself it usually appears to be a superfluous expense. If the human element and the corrosive atmosphere are ignored, it certainly does not contribute to the process. As an overhead item it is essential to design for adequate ventilation at a minimum overall cost.

The first cost for an exhaust system is the engineering cost. One can afford to be lavish at this stage more than any other, since a dollar spent on layout and design represents a great many dollars for equipment, installation, maintenance, operation, heating, and replacement.

The initial sizeable item of expense will be for equipment cost. This will include hooding, ducting, and fans. If large volumes of air are handled, an air inlet will be required and possibly means for filtering and heating the air. Even if a part of the air is recirculated, equipment may be required for conditioning of makeup air.

The installation should be planned at the engineering stage. The engineering cost will be absorbed by a fabricator if he is given a layout or specifications. He may or may not erect the system. In any case, the problems of adequate support, space required, and holes for stack outlets, should be estimated at the engineering stage in order to avoid the possibility of expensive erection changes.

Maintenance costs are generally low, if proper materials of construction are used, and usually all that is required is an occasional cleaning of the system until such a time as repair or replacement may be required. If improper materials are used, (such as plain steel for an acid duct) replacement can be required in as little as 3 or 4 weeks.

Heating may be a major operating expense. More heat will be required for the tanks, but this will be a minor item compared to the cost for heating cold air brought directly into the plating room. As a generalization, it has been estimated that each 1000 cfm of air costs about 40 dollars per year for heating in the northern part of the country on a ten hour per day basis.

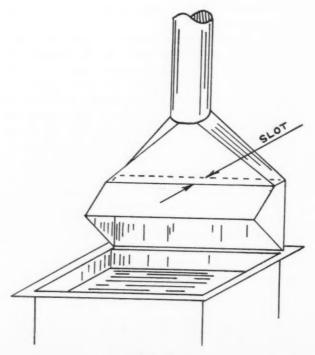


Figure 1

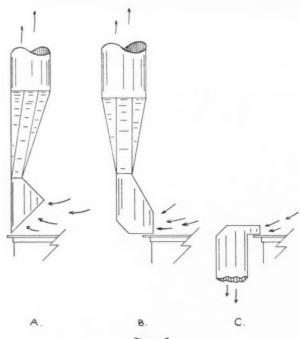


Figure 2

For a complete cost it is necessary to estimate the life of the equipment. The replacement cost will be somewhat less than the original cost since the support for the system will at least be partially reusable.

On the general subject of costs, the following story is interesting. A small shop was quoted \$2,500 for a fabricated plastic scrubber so, as an alternative, he built a scrubber of wood for \$50. Where a simple wooden box, a small blower, and a few sprays will do a job this is the most economic answer for a small shop. The same would be true where a hood, a fan, and a few lengths of galvanized pipe will provide adequate ventilation. For a large installation, the cost of engineering and estimating the system alone can be a considerable item. For a small installation in a large well organized plant, it is possible that estimating, engineering, prints, work orders, purchase orders, and incidental paper work will cost more than the installation. This does not mean that estimating and engineering should be abandoned nor does it mean that all scrubbers should be made of wood. Unless the job is so small that a good workman can install it from a simple sketch, it is best to estimate the cost for two or three of the most logical methods and materials. Usually the most money can be saved at the paper stage and the final analysis frequently comes out differently than expected. It is much cheaper to change a few lines or words on a print than to alter plans after an order has been placed.

#### Materials of Construction

Hoods and ducts may be made from galvanized steel, galvanized and painted steel, steel and asphalt, rubber lined steel, stainless steel, wood, and plastic. All are used, as well as other materials and combinations, and each can be cheaper than all others for a specific application.

Galvanized steel is the cheapest material for construction and is preferred for exhausting non-corro-

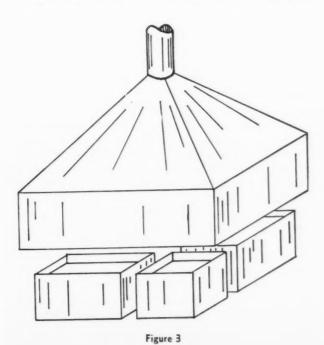
sive vapors such as solvents. It also has a fair life for water vapor and mild alkali. For mildly corrosive conditions, a few coats of paint will greatly extend the life of galvanized constructions. For severe acid fumes, rubber-lined steel, asphalt coated wood, and plastics may be used for the lowest over-all cost. In many cases, it will be advisable to erect two or more ventilating systems and to use different materials for each system in order to obtain satisfactory life at low cost.

#### Design of Exhaust System

A common type of exhausting equipment consists of a single slotted hood, as shown in Figure 1. Hoods of similar construction are fabricated for specific applications. Similar hoods are also available as stock items in standard lengths. The hood consists of a collecting opening tapering to a slot of predetermined size. From the slot into the duct the cross sectional area is held constant within practical limits. This cross section is selected to maintain recommended velocities within the exhaust system of 1500 to 2500 fpm. The selected velocity is known as the slot velocity, and is the basis for calculation of slot sizes and duct sizes.

Effective removal of fumes, of course, depends on the flow of air over the surface of the tank. The exhaust rate is based on the surface area of the tank and is usually in the range 120 to 250 cfm per sq. ft. of open tank surface.

High exhaust rates are required for toxic fumes, such as hydrochloric acid. However, temperature and chemical concentration are factors to be considered. The fumes from concentrated hydrochloric acid are unhealthy even if the acid is cold. With sufficient dilution the cold acid need not be ventilated. However, more dilute acid must be ventilated if it is heated or if spray is given off due to pickling action. Chromic acid spray due to electrolysis is extremely obnoxious and harmful. If conditions are classed as severe, a high exhaust rate should be used. The amount of spray is



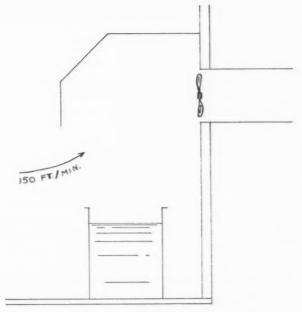


Figure 4

another factor to be considered. A heavy spray can be generated in an alkaline bath for etching aluminum.

If a single slot is used, a higher exhaust rate will be required for a wide tank than for a narrow one. For an open tank the usual exhaust rates should only be applied for tanks up to two feet wide. If the tank is against a wall, the wall will act partially as a baffle so that all air enters from the front and the tank may be  $2\frac{1}{2}$  feet wide with a single slot. If baffling is used at the sides of the tank, the same effect can be obtained in an open room. The position of the tank, movement of cross currents in the room, the location of space heaters cooling fans, and the use of baffling can require a modification of  $\frac{1}{2}$  to 2 times the standard exhaust rate.

Standard hoods similar to Figure 1 should not be used over six feet long. For longer tanks two hoods or hoods with multiple exhaust outlets have been used. However, single slots of 20 feet and greater length with a single exhaust outlet have been successfully used by resorting to special design of the slot, such as tapering of the slot and baffling within the slot. Adjustable slots can also be changed for more uniform air intake along the length.

For tanks wider than 21/2 feet, hoods on both sides are frequently used. If the tank is not too long or if it is square, baffling or push-pull may be other means for effective ventilation. If the hood extends partially over the tank, the result will be similar to a slot at the edge of a narrower tank. Air collecting openings are shown in Figure 2. The "A" design can often be used, since the area at the edge is needed for anode space and the hood will not obstruct the work. If the entire tank surface is needed then a design similar to "B" will be used. A slightly higher ventilation rate should be allowed. If a crane operates overhead or if work passes over the tank, a downdraft hood, as "C", will be required. Drafts readily interrupt air flow for this open construction. Consequently, higher exhaust rates than for updraft will be required.

#### Exhaust Rates

Exhaust rates for common baths are given in Table 1. The rates can also be described in general terms.

#### SEVERE — 250:

For a fuming bright dip, a tank up to 2 feet wide and no cross drafts. Hot concentrated hydrochloric acid would also be severe, although uncommon.

#### HEAVY - 200:

Hot baths near the boiling point, toxic spray such as chromic acid, or irritating spray at high temperature such as heavy duty electrolytic cleaning.

#### Intermediate — 160:

Warm baths that are heavily worked or toxic baths lightly worked.

#### MODERATE - 120:

Warm to hot water and light duty for objectionable spray.

#### MILD - 60:

Cold chlorinated solvents, ventilation of a vapor degreaser, or conditions where some ventilation may be desirable. Borderline cases.

If a tank is small and well baffled, severe chemical conditions may be rated as "heavy" and the exhausting rate reduced. On the other hand, severe conditions, such as bright dipping, may require an exhaust rate of 300. By considering the chemical, temperature, and electrolysis modified by baffling, tank size, and location, the proper category can be chosen. The exhaust rate must be adequate, but an excessive rate is costly in terms of larger equipment and heating of air. In a multiple exhaust system, adjustable slots or baffles in the ducts will allow adjustment, so that air velocities can be increased at some tanks at the expense of those tanks where an excess was allowed in the original design.

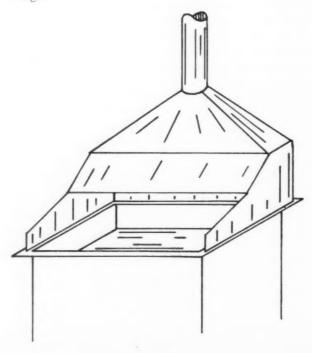


Figure 5

TABLE I

Exhaust Rates for Common Plating and
Processing Baths

Bath	Temp. ${}^{\circ}F$ .	cfm/sq.ft.
Brass	100-140	0
Cadmium Cyanide	70-100	0
Chromic Acid		150-200
Acid Copper	70-120	0
Cyanide Copper		0
Cyanide Copper		120-150
Gold	WO 7.00	0
Iron	80-140	120-150
Lead	70-100	0
Nickel	100-140	0
Silver	70-100	0
Acid Tin	70-100	0
Alkaline Tin	160-180	120-200
Zinc Cyanide	70-100	0
Water	70-140	0
Water		100-120
Water		120-150
Water	180-210	150-200
Electrocleaner	120-140	100-120
Electrocleaner	140-180	120-150
Electrocleaner	180-200	150-200
Fuming Bright Dip	70-120	200-300
Chlorinated Solvents		60
Sulfuric Acid		120-150
Hydrochloric Acid		120-200
Nitric Acid		120-200

For most tanks, ventilation is not required and, in many cases, only steam or water vapor is removed. Where ventilation is required, use the high limit of Table 1 for high temperature and heavy work loads, but modify these according to the general classifications discussed above. Specific recommendations are difficult due to the variations in conditions as well as local health requirements. For local requirements contact health authorities, ventilation engineers or fabricators.

If conditions are moderate, tank widths up to 4 feet may be used for a single slot. However, the ventilation rate should be increased to 150 to 180. This means that the total rate would be  $2\frac{1}{2}$  to 3 times that of a 2 foot tank or 25 to 50% greater than for slots on both sides.

The removal of water vapor from hot, non-toxic tanks is really a case of maintaining low humidity for comfort and to avoid condensation within the plant. For confined areas, removal at the tank is the most efficient means. If the plating area is a small department within a large room, a canopy may be used for general ventilation of the area, as in Figure 3. The worker, in this case, will be exposed to the vapors and fumes, since he will be inside the canopy. Consequently, this method can only be used for non-toxic conditions and where air movement is sufficient to maintain acceptable comfort. For removal of water vapor and heat, just enough air is provided to the canopy to aid the natural convection. The canopy is a better construction than a totally enclosed area, since cross drafts will

(Continued on page 98)

# **Finishing Pointers**

#### Shunting of an Ammeter

OCCASIONALLY an emergency arises when it becomes necessary to measure currents that are larger than the capacity of the meters that are available. This problem can be resolved by the use of a shunt.

All ammeters are shunted so that the shunt will carry most of the current and a small portion of the current passes through the coil of the galvanometer circuit to actuate the instrument. The ammeter consists of parallel circuits, one through the coil of the instrument and another through the shunt.

Ammeters are manufactured with internal shunts and external shunts. The internal shunt is placed within the case of the instrument for a total current of 25, and in some instruments, 50 amperes. For larger currents an external shunt is used so that heavy contacts can be made directly to the shunt, so that a large instrument case will not have to be used, and to avoid heating of the instrument by the current passing through the shunt.

Most ammeters have a voltage drop of 50 millivolts which means that at full scale deflection the voltage across the shunt is 0.050 volts.

With the above facts in mind, the capacity of an ammeter can be increased by construction of a temporary shunt. All that is required is to place a second shunt in parallel with the existing shunt or to replace the shunt with a proper fixed resistance.

As an example, assume that a 25 ampere meter is available and it is desired to use it at 500 amperes. The internal shunt has a conductivity at full scale deflection of:

$$C = \frac{I}{E} = \frac{25}{0.050} = 500 \text{ mho}.$$

The desired conductivity is:

$$C = \frac{I}{F} = \frac{500}{0.050} = 10,000$$

The conductivity to be added is:

$$10,000 - 500 = 9,500.$$

From the table for the conductivity of copper wire, No. 8 wire has a resistance of 0.628 ohms per 1000 lineal feet.

The length of wire required will be:

$$\frac{1}{9,500\times0.628}\times1000\times12=2.01~\mathrm{inches}$$

The assembly of the meter and shunt is shown in the sketch.

The practice of making temporary shunts is often useful but should only be done as a temporary or emergency measure. Also, the inadequacies of the temporary equipment should be kept in mind. First, a meter is being used where it is necessary to multiply by some factor to obtain the amperage. This would be 20 for the example given. Second, the shunt was not constructed according to good practice for a permanent shunt. Third, the meter should be standardized against another meter that is available to determine if the reading will be satisfactory.

Better practice can be used to make a more satisfactory shunt. The shunt can be made from chrcmel wire which does not change resistance with change in temperature and it can be remote from the instrument by the use of leads from the meter to the shunt. Of course in this case the resistance of the leads should be taken into account.

A fairly heavy copper wire was used in the example given so that it would be as heavy as possible to carry the current. If a heavier wire were used it would not be sufficiently long. If a lighter wire were used it would carry excessive current for the wire size.

When a shunt is constructed, care should be taken to see that contacts are clean. The wire to be used as a shunt should be brazed to two washers so that there will be a minimum of fluctuation of voltage drop across the terminals of the instrument due to any changes in contact resistance.

With the resulting disadvantages in mind, temporary shunting of a meter will take care of emergencies or it will provide an instrument for temporary work. If the instrument is checked by placing it in series with another instrument the possibilities of errors will be indicated. Such a check should be made at full scale and for a reasonable length of time to check at the point of maximum current and to determine if the effects of heating of the shunt or the contacts is likely to cause trouble. If this cannot be done a check at ½ scale will be reasonably accurate.

Resistance of Copper Wire

Wire No.	Diam. in.	Ohms per 1000 ft.
1	.289	.124
2	.258	.156
4	.204	.248
6	.162	.395
8	.128	.628
10	.102	.999
12	.081	1.59
14	.64	2.52

# Surface Treatment and Finishing of Light Metals

Part VIII. — Hard Anodizing

By S. Wernick, Ph.D., M.Sc., F.R.I.C., F.I.M. and R. Pinner, B.Sc.

This is the second half of Part VIII of this series by Dr. Wernick and Mr. Pinner. The first half appeared in the May issue.—Ed.

#### Properties of Hard Anodic Coatings

The effect of alloy composition on the growth of an M.H.C. hard-anodic coating is seen in Fig. 8. On the whole, all of the alloys show uniform growth equal to approximately half the coating thickness. The color of the coatings depend on the alloy and coating thickness. 61S and 24S have a tan or grey color which darkens to jet black at 3 mils. The coatings on 75S and XA-78S alloys turn black at 1 mil and subsequently turn lighter again, through blue-grey to almost white at 9 mils. As would be expected, the coating on 99.99 per cent aluminum is colorless at 1 mil and slowly turns light brown up to 5 mils.

In all hard-anodized coatings, fine failure cracks are present when the component is withdrawn from the bath and these increase as the surface warms up after withdrawal. This type of crazing is seen in Fig. 9. If held against the ear, this cracking is clearly audible. In the case of some alloys, notably 24S Alclad, the coating may blister. This is liable to occur when the thickness of the coating exceeds that of the cladding.

Surface roughness is generally increased by hard anodizing, particularly on bar. The usual practice is, therefore, to anodize oversize (allowing also for the growth of the metal) and to lap down to the final dimension.

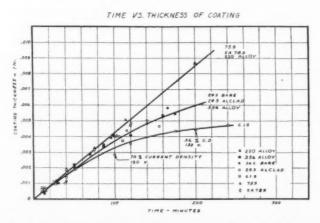


Fig. 8. Time versus coating thickness on a number of aluminum alloys treated by the M.H.C. process. 16

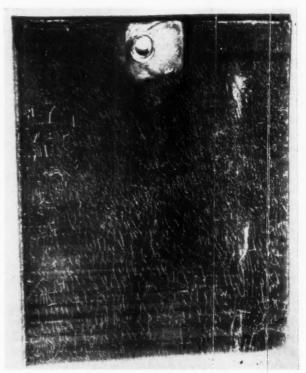


Fig. 9. Commercially pure aluminum sheet with 3-mil hardanodic coating. The crazed pattern is due to differential thermal expansion. Some of these cracks are present when the piece is withdrawn from the bath.<sup>16</sup>

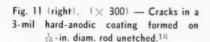
At times it has been noted that a hard coating does not form satisfactorily at corners. This "corner defect" is due to the fact that, as the specific value increases during coating, the corner cannot expand in three dimensions and a void occurs. This is illustrated in Fig. 10 and is more pronounced in the thicker coatings. The number of cracks in relation to the radius as shown on rods of different diameters is shown in Table I and Fig. 11.

. TABLE I
Influence of Radius on Cracks in M.H.C. Coating

Diameter (in.)	Circum- ference (in.)	No. of cracks	Cracks per in.
1_6	0.196	36	184
/8	0.393	28	.71
3	0.590	25	42
4	0.785	37	34
Straight section	1.125 long	12	11



Fig. 10 (above). "Corner defect" which occurs due to the mechanism of the coating process. The defect becomes accentuated as the coating thickness increases. 16









It is seen that even the fairly large radius of  $\frac{1}{8}$  in. ( $\frac{1}{4}$  in. diam.) results in three times the number of cracks as compared to the straight section. However, the coating on even the  $\frac{1}{16}$ -in. diam. piece was quite adherent. Nevertheless, the radii should be as large as possible and this fact must be taken into account in design.

The throwing power of the M.H.C. process was tested by Gillig<sup>16</sup> and was shown to be excellent. Results on a tube of 61S-T6 alloy 5 in. in length and of dimensions 3/8-in. diam. by 0.049-in. wall were as follows:—

	Outside coating thickness (mil.)	Inside coating thickness (mil)
Open end	2.5	1.7
Center	2.5	1.6
Closed end	2.5	1.0

#### HARDNESS AND WEAR RESISTANCE:

Micro-hardness tests have been carried out on a number of hard-anodized surfaces, and have shown hardness values of 500 V.P.N. for the Hardas film<sup>5</sup> and 530 V.P.N. for a coating produced by the M.H.C. process on 615-T6 alloy.<sup>8</sup> Recent tests carried out by

the Aluminium Development Association have been reported by Brace<sup>4</sup> (see Table II). These results show that the values obtained are not independent of the load and of the hardness of the basis metal. The low value obtained for LM10-W are stated to be due to the presence of magnesium oxide in the coating, and similar low values have been obtained in the U.S.A. with 24SM (similar to HE15).

More reliable than hardness values are probably tests showing the wear-resistance of the coatings directly.

In a number of tests carried out by the Aluminium Development Association using the Schuh and Kern method, a 5.1-mil coating on the NS4 alloy (Al-2 per cent Mg) gave a result of 1,026 g. (weight of abrasive required to penetrate the coating), compared to 615 g. for a 2.7-mil MHC coating on 75ST, corresponding to specific abrasion resistances of 201 and 227 g. per mil respectively.<sup>4</sup>

Rather smaller values have been reported by Vanden Berg,<sup>9</sup> whose results for coatings produced by the M.H.C. process, of the Alumilite hard-anodizing processes and the Alumilite normal anodizing processes are given in Table III for different alloys. These results were obtained by use of blasting 180-grit emery through a  $\frac{1}{64}$ -in. dia. orifice at 5 lb./sq. in. air pressure.

TABLE II — Microhardness Values of Hardas Coatings

		Nominal	М	icrohardne Load (		
Material	Condition	composition	7.5	15	30	45
SIC-1/9 H.	1/2 Hard	Commercially Pure Al	353	481	496	357
NS6-1/4 H.	1/4 Hard	Al-5 per cent Mg	440	460	452	363
LM10-W.	Solution heat-treated	Al-10 per cent Mg(Cast)	301	282	312	336

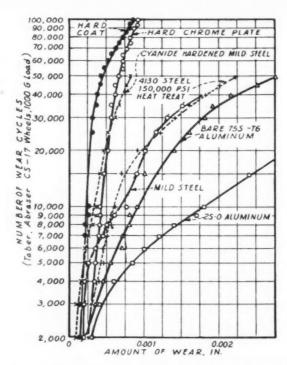


Fig. 12. Comparison of wear resistance of M.H.C. hard coating with that of other materials and coatings. 17

In a comparative test with cyanide-case-hardened steel the same author reported that approximately twice the wear resistance was shown by the M.H.C. hard-anodized aluminum after 50,000 cycles in a Taber abrasion tester.

Results showing comparative wear-resistance with hard chromium deposits and cyanide hardened and heat-treated steel are shown in Fig. 12.<sup>17</sup>

Of possibly greater importance than the values for

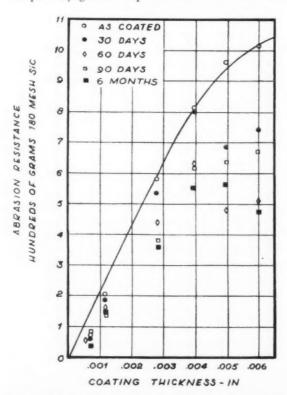


Fig. 13. Influence of atmospheric resistance of coating thickness on abrasion resistance of M.H.C. coating on 24S Alclad. 16

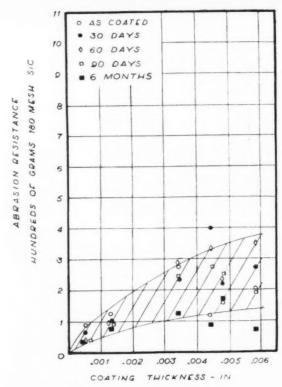


Fig. 14. As Fig. 13 on 24S bare. 16

abrasion resistance obtained directly after hard anodizing is the extent to which the abrasion resistance is reduced in time under the influence of corrosion. This is shown by tests carried out by Gillig<sup>16</sup> whose results for M.H.C. coatings for several alloys are reproduced in Figs. 13, 14 and 15.

These samples show that deterioration in abrasion

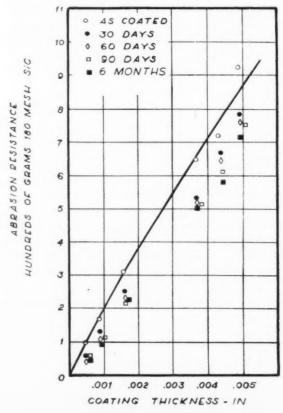


Fig. 15. As Fig. 13 on 615.16

resistance over six-months' exposure to the atmosphere can be quite pronounced and will depend to some extent on the alloy, e.g., the reduction in abrasion resistance on 61S is lower than on 24S Alclad, while on bare 24S alloy (Duralumin type), the abrasion resistance which is initially rather low rapidly becomes even more unsatisfactory on exposure. Excellent abrasion resistance was shown also by the hard anodized casting alloy Alcoa 356, due in part to free silicon being entrapped in the coating.

#### HEAT RESISTANCE:

The anodic coating is a good insulator and this may be a disadvantage in mechanical applications where heat dissipation is low. On the other hand, good heat resistance is shown by hard-anodized aluminum. Of specimens treated by the Hardas process, heating to 300°C. six times for 10 min. each cycle had no effect on commercial aluminum and casting alloy, while 5 per cent Mg alloy showed progressive crazing each cycle, though this did not occur at 200°C. Casting alloys blistered at 300°C., while other alloys crazed heavily and developed warts at 150°C. Crazing seems to occur alternatively to exfoliation of the coatings and, in fact, crazing did not seem to have an adverse effect

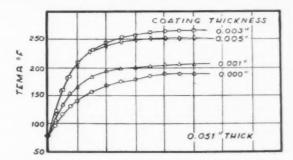


Fig. 16. Temperature reached by 61S alloy in relation to coating thickness.16

on the running of hard-anodized aluminum-alloy pis-

Fig. 16 shows the result of one of a series of absorption tests carried out by Gillig. 16 In this test a thermocouple was held against the back of a test-piece placed 6 in. from an infra-red bulb under standard conditions and shows that the heat absorbed increased with coating thickness.

Of some importance in some applications, particularly in the aircraft industry, is the resistance of hardanodized aluminum to direct flame impingement, and

TABLE III — Specific Abrasion Resistance of M.H.C. and Alumilite 226 Hard-anodized Coatings Compared with Conventional Anodic Coatings (Alumilite 204)

Alloy	British related alloy	Type of coating	Thickness of oxide coating (mil.)	Weight of abrasive taken through coating (gm.)	Weight of abrasive per mil of coating (gm.)
2S-H18	SIC-H	Alumilite 204	0.47	35	75
		Alumilite 226*	2.24	387	173
		M.H.C.	2.77	405	146
3S-H18	NS3-H	Alumilite 204	0.53	33	62
		Alumilite 226*	2.33	368	158
61S-T6		Alumilite 204	0.46	41	89
		Alumilite 226*	2.15	364	169
		M.H.C.	2.31	390	169
75S-T6	DTD 683	Alumilite 204	0.45	46	102
		Alumilite 226*	2.13	357	168
24S-T3	H15-W	Alumilite 204	0.41	22	54
	(Dural)	Alumilite 226*	2.10	142	58
		M.H.C.	2.48	163	68
	*/	Alcoa hard-anodizing process.			

TABLE IV — Resistance to Direct Flame Impingement of Hard-anodized Aluminum Alloys (M.H.C. coating<sup>16</sup>)

				Coating thic	kness (mil)			
		1	1			ì	5	
Alloy				Time to fai	lure (min.)			
61S	0.49	0.52	0.60	0.52	0.74	0.86	0.87	0.85
XA78S	0.60	0.63	0.83	0.87	1.09	1.02	0.94	1.05
24S	0.50	0.56	0.70	0.71	0.77	0.76	0.97	1.02
24S Alclad	0.55	0.55	0.64	0.79	0.78	0.82	1.10	1.02
75S	0.48	0.49	0.66	0.68	0.90	0.73	0.98	0.94
356	2.	55	3.	80	4.	06	5.	81
220	2.	55	3.	29	5.	20	3.	10

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TABLE V
Breakdown Voltage Values for Hardas Films

٠,	Thickness (mil)	Unscaled	Sealed in boiling water	Sealed in boiling water and impregnated with paraffin wax
1		. 250	250	550
2		950	1,200	1,500
3		1.250	1.850	2,000
4		1.850	1,400	2,000

some results obtained with different alloys and coating thicknesses are shown in Table IV.<sup>16</sup>

The results show that, in nearly all cases, the time to failure increased with coating thickness. Under stress, however, it is probable that little or no improvement would be obtained.

#### **ELECTRICAL PROPERTIES:**

The breakdown voltage of Hardas anodic coatings is shown in Table V.5 These results were obtained on 31/2 per cent Mg alloy. As shown, the coatings are highly insulating and this property can be further improved by hot-water sealing and waxing. The effect of hotwater sealing by itself is inconclusive. Breakdown voltages up to 3,750-volts are quoted by the Glenn L. Martin Co.3 According to Brace, pure aluminum or a homogeneous alloy composition must be used to obtain consistent results. These materials will also give the highest breakdown values as impurities in the film, particularly when due to degregated constituents, will normally improve the conductivity. Where the highest breakdown voltage is of importance a high forming voltage should be used to increase the barrier layer thickness.

#### ADHESION:

A number of bend-test experiments carried out by Gillig<sup>16</sup> give a good indication of the adhesion as well as the mechanical strength of the hard anodic coatings. In this test specimens  $\frac{1}{16}$  in. thick x 1 in. wide x 8 in. long were bent in a vise and the free bend radius measured at which the coating cracked. It is interesting to note that failure always occurred in the compression side.

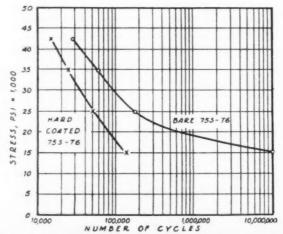


Fig. 17. S-N curve showing the marked drop in endurance limit of hard-coated aluminum.<sup>17</sup>

#### MECHANICAL STRENGTH AND FATIGUE PROPERTIES:

Table VI shows the effect of hard anodizing on the tensile strength of a number of alloys.<sup>17</sup> It is seen that there is a slight decrease in tensile strength with coating thickness in the case of almost all the alloys tested, but this is not normally sufficient to detract from the use of the hard anodizing process.

Elongation is, of course, reduced by hard anodizing and the endurance strength is also markedly reduced as seen in Fig. 17.

The fatigue strength was also measured by Gillig<sup>16</sup> and his results on annealed 76S specimens 0.053-in. thick, and after hard anodizing to 2 and 3 mil, are shown in Fig. 18. A similar decrease in fatigue resistance is shown and the general conclusion is that, while the coating lowers endurance strength considerably at high stress, the decrease at low stress is comparatively small. The coating thickness has little influence, and at any rate with the unclad alloys, much the same results are obtained at above 1 mil thickness. The decrease in endurance strength is believed to be due to stress concentration at the microcracks in the coating. As is shown in Table VII, which summarizes the effect of alloy composition, little or no difference is found in

TABLE VI — Mechanical Properties of Hardas Hard Anodic Coatings

Basis metal	Coating thickness (mil)	U.T.S. (lb. per sq. in.)	Elongation in 2 in. (per cent)
61S-T6	_	47,700	12.0
(0.032 in. thick)	0.5	49,100	12.5
	1.0	48,800	11.5
	3.0	45,400	8.0
	5.0	45,100	5.5
XA78S-T6		89,700	12.0
(0.032 in. thick)	0.5	91,000	10.0
	1.0	90,500	9.6
	3.0	86,700	6.0
	5.0	86,500	12.0
24S-T3	0.0	67,700	18.0
(0.032 in. thick)	0.5	66,500	17.5
	1.0	67,200	15.0
	3.0	62,700	11.0
	5.0	58,600	
24S-T4 Alclad	_	64,200	17.5
(0.032 in. thick)	0.5	65,400	16.0
	1.0	67,000	14.0
	3.0	64,000	11.5
	5.0	58,200	
75ST	-	80,000	8.5
(0.033 in. thick)	0.5	80,600	7.5
	1.0	79,800	7.5
	3.0	78,000	7.0
	5.0	72,900	6.5*
356-T6	0.5	24,750	3.0
(0.150 in. thick)	1.0	29,700	6.5
	3.0	26,350	4.0
	5.0	31,200	5.5

\*Coating flaked off partially.

†Started flaking

‡Gauge marks lost when coating flaked off.

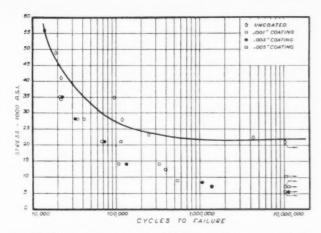


Fig. 18. Effect of hard coating (M.H.C.) on fatigue strength of 75S alloy specimens 0.51 in. thick.

the cast alloys which have a low endurance strength in the uncoated state.

#### CORROSION RESISTANCE:

The effect of exposure on the abrasion resistance of hard-anodized aluminum alloys has been noted above. Little information is yet available as the only investigations reported are not yet complete. Preliminary results show, however, that 24S alloy (not clad) is somewhat inferior to most other alloys, and results on this alloy confirm that it is not normally suitable for hard anodizing. On the whole, there is apparently no less protection given by "hard" as opposed to normal anodizing. It must not be assumed that the thicker coatings will necessarily give better protection, as in thick coatings the tendency to crack undoubtedly decreases the corrosion resistance by acting as capillaries for the entry of moisture.

In some interesting experiments on the effect of rain erosion at high velocity, undertaken to stimulate the effect on leading edges of aerofoils, Gillig showed that failure depends primarily on the alloy. The best results are obtained with 24S Alclad, 61S and 24S, and XA-78S in that order. With increasing thickness the resistance to rain erosion is decreased. Failure in the case of 24S alloy (not clad) was shown by spalling of the coating in layers while on 61S, 75S and XA-78S failure followed the microcrack structure.

TABLE VII — Endurance Strength at 10<sup>6</sup> Cycles on Hard Anodized (M.H.C.) Aluminum Alloys (lb. per sq. in.)

Alloy	Uncoated	Coated	Per cent
24S Alclad	11,000	7,500	32
24S bare	19,000	15,000	21
75S	22,000	9,000	59
75S Alclad	12,000	10,000	17
XA-78S	26,000	9,000	65
61S	15,000	6,000	60
220	7,500	7,500	0
356	8,000	8,000	0

#### APPLICATIONS:

Hard anodizing is still very much in its infancy as a commercial process and only a limited number of applications have yet occurred in practice. These include: hydraulic gear, e.g., pistons, screw threads of hydraulic jacks, railway wagon buffers, and aircraft undercarriage legs. In the latter the sliding surfaces are hard anodized to reduce friction. In the case of the buffers, the bores are given a 3-mil anodic coating by the Hardas process, the operation being carried out at 350 amp. over the 150-sq. in. surface with an a.c.: d.c. ratio of 1:3. The treatment time was 9 min. In this application a hollow cathode was used through which the electrolyte was pumped into the  $\frac{3}{8}$ -in. diameter annular at the base at the rate of 50 ft. per min.

Another application is in the coating of high-speed air-impellers and for the production of flame and chemically resistant surfaces in cordite cartridge containers used in a gas-turbine starter. Other successful applications for wear-resistance include the coating of a die-cast-aluminum metal-spraying gun, film-strip finishes on 35-mm. film projectors, parts in cigarette wrapping machinery and aluminum rollers for a cardboard-box forming machine. In this instance, hard anodizing is stated to have superior wear resistance over hardened steel. Aluminum gears for ticket machines, feed plates in sorting and coating machines, surgical splints, cast electric motor brush boxes,4 as well as valves, fuel- and oil-pump housings, cams, aircraft abrasion strips, bearings, clutch and brake discs, fans and nozzles, timing and mechanical computer gears are other successful operations.15

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## Science for Electroplaters

15. Electrical Power

By L. Serota

THE rate of conversation of electrical energy into heat, as in the immersion heater — or into work, as in the operation of a motor of a motorgenerator set — is called (electric) power. The power required for a continuous flow of current is equal to the product of volts (emf) by current (amperes). P (power) = E (volts)  $\times$  I (current).

The unit of electric power is the watt (w), which corresponds to the power used when a current of one ampere is caused to flow by a pressure of one volt. The commercial unit is the kilowatt (kw), which is equal to 1000 watts. The mechanical energy obtained from an electric motor, rated in horsepower, corresponds to 746 watts for one horsepower. A kilowatt is equal to 1000/746 or 1.34 horsepower. A 2000 ampere/6 volt motorgenerator set would represent a power output of  $P = EI = 2000 \times 6 = 12,000$  watts or 12 kw.

Since the generator does not operate at 100 per cent efficiency, the motor capacity must be of sufficient size to provide the excess power for driving the generator. If the efficiency of the generator is rated at 80 per cent, then the actual power that the motor must furnish would be 1200/0.80 = 15,000watts or 15 kw. The horsepower of the motor would then be 15000/746 =20.1 hp. or  $15 \times 1.34 = 20.1$  hp. Thus a 20 horsepower motor would be required for effective operation of the generator. For "estimating purposes only" a divisor of 600 instead of 746 (watts) is used to determine horsepower of a motor. This gives a figure

that is about 25 per cent greater than the theoretical. The motor capacity is therefore about ½ size larger than that required to drive the generator. It also provides the excess power that compensates for running losses in the set as well as occasional overloads.

#### Electrical Energy and Heat

The energy that is used by an electric unit during the passage of current is equal to the power multiplied by the time. Power  $\times$  time = energy. When the power involved is measured in watts and time in hours, the rate is expressed as watts  $\times$  hours = watthours. A watthour, therefore, represents the energy used when one watt is consumed for one hour. The commercial unit is the kilowatt-hour, which corresponds to 1000 watt-hours.

When a current flows through a circuit, some of the power which is used to overcome the resistance of the circuit produces heat. In the operation of a motor, for example, the electrical energy that is not transformed into mechanical energy is turned into heat energy. The heat thus produced will be in proportion to the number of watts required to overcome the resistance to current flow in the circuit. This factor of electrical consumption, wherein heat is produced, accounts for the low resistance conductors used for busbars when circuits are required to carry a current upwards of 100 amperes. Since the voltage provided in plating operations is low, the IR drop would result in an appreciable reduction of generator voltage. If, for example, the resistance of a conductor is 0.01 ohm, then the IR drop for a current of 100 amperes would be:  $E = IR = 100 \times$ 0.01 = 1 volt. For a 6 volt generator the emf at the tank as a result of this line drop would be but 5 volts.

Copper bus bar is universally used in plating installations. The amount of copper bus bar required for such installations may be estimated on the basis of not less than one square inch of cross section for each 1000 amperes, if the distance from the power source to the tank is less than 15 feet (30 feet total distance for current flow). When the distance exceeds 15 feet a safe operating figure recommended is 750 amperes. Standard lengths of bus bars are 10, 12 and 14 feet.

Aluminum bus bars should also be given careful consideration. A comparison of the characteristics of aluminum and copper conductors at 20°C, show that aluminum is rated at 60.97%

conductivity and 13.36 micro-ohms per square inch per foot resistivity. The cross sectional area of the aluminum bar would be 62.37% greater than that of the copper bar to carry the same amount of current. However, because of the difference in density of the two metals, such an aluminum bar would weigh only 49.4% as much as the copper bar.

The corrosive action of acids and salts on aluminum is such that the metal is not satisfactory for use as tank bars or hangers. Hard drawn copper is usually recommended for tank bars, since it is sufficiently strong to support the weight of the anodes and cathodes, and the increase in resistance compared to soft annealed copper is relatively slight. Where brass is used for long tank bars the size must be checked so that the resistance will compare with that of the copper bar conductor.

Power loss due to the line voltage drop for the problem calculated can be computed from the formula  $P = I^2R$ , which is derived as follows: P = EI; since by Ohm's Law E = IR, the value IR can be substituted for E in the above formula; hence P = EI or  $IR \times I = I^2R$ .

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 $P = I^2R = (100)^2 \times 0.01 = 100$ watts, which represents the power loss due to the line resistance, resulting in a temperature rise. A higher temperature will cause increased resistance, resulting in greater voltage loss. An increase in temperature can be kept to a minimum by exposing as much surface of the conductor as possible for heat radiation. The flat type copper bus bar is preferable to the round type conductor because a greater area (surface) is exposed to radiation; also, such bars can be mounted or extended more effectively. Two common sizes are the 1 by  $\frac{1}{4}$  inch and the 2 by  $\frac{1}{4}$ inch for larger installations.

#### Heat Equivalent of Electricity

The conversion of electrical energy into heat energy may be calculated by reducing the electrical units of energy into heat units. The heat required to raise 1 gram of water 1°C. is called at calorie. A current of one ampere flowing through a resistance of one ohm for one second will raise the temperature of 1 gram of water 0.24°C.: that is, one watt-second (a joule) of electrical energy is equivalent to 0.24 calorie. The value or factor (0.24) is referred to as the heat equivalent of electricity; hence H = 0.24 I²Rt.



Since I<sup>2</sup>R = watts, I<sup>2</sup>Rt = watt-second or joule. In (steam) engineering calculations, the unit of heat is the British thermal unit (Btu) which represents the amount of heat required to raise 1 pound of water 1°F. One Btu is equivalent to 1055 joules or 252 calories, and 1 kilowatt (kw) is equivalent to 56.88 Btu per minute. The rate, therefore, at which heat is produced per second is proportional to the resistance and to the square of the current,

The heat produced when a current of 50 amperes flows for 10 minutes (600 seconds) through a resistance of 1 ohm would be: Heat =  $0.24 \text{ I}^2\text{Rt} = 0.24 \times 50 \times 50 \times 1 \times 10 \times 60 = 360,000$  calories or 360000/252 = 1429 Btu.

In the electrolytic operation involving anodizing (sulfuric acid bath), temperature control is critical. When the anodized coating is intended for dyeing purposes and the temperature may be as low as 70°F. the question arises as to whether a heating unit should be provided. The view expressed by many is that since practically all of the electrical energy input is converted into heat, one of two runs in a cold tank will raise the temperature to the desired operating temperature. For example, if a tank containing 850 gallons of solution draws 1400 amperes (24 volts) and, since for experimental purposes it is assumed that 100% of the electric input is converted into heat, then: current × voltage = watts or  $1400 \times 24 = 33,600$  watts or 33.6 kw. 1 kw = 56.88 Btu/min; hence 33.6 Kw  $\times$  56.88 = 1910 Btu per minute of anodizing. Since 1 Btu will raise the temperature of 1 lb. of water 1°F. and 850 gallons of solution would be approximately 7000 pounds:

1910 Btu/min.  $\times$  30 min. = 57,300 Btu.

57,300/7000 = 8.4°F. rise in temperature in 30 minutes of anodizing. If the temperatures of the bath were 60°F., it would take one hour to raise the temperature to 76.8°F. If the process is limited to dye work, a heating unit should be installed, as aluminum parts anodized at 60-70°F. will not dye uniformly or give the same depth of color as those obtained at the higher temperature. Fig. 47 illustrates a typical commercial immersion heater suitable for heating electroplating, electropolishing, pickling, cleaning and phosphating solutions.

#### Electric Heating

The amount of current required to heat a solution by means of an electric heat exchanger may be demonstrated by the following example. A solution in a cleaner tank, 36 inches by 24 inches by 30 inches, is to be heated from 60°F. to 210°F. The capacity of the tank is  $36 \times 24 \times 30 = 25{,}920$  cubic inches. Since 231 cubic inches is equivalent to 1 gallon, the capacity in gallons would be  $25{,}920/231 = 112$  gallons. Assume that the weight of 1 gallon of the

cleaner solution to be that of 1 gallon of water, 8.33 lbs., then:

Weight of cleaner solution 
$$= 112 \times 8.33 = 934 \text{ lbs.}$$

Temperature increase 
$$= 210 - 60 = 150$$
°F.

Btu required = 
$$934 \times 150 = 140,000$$
 Btu

Heat loss (surface + tank) 10% = 
$$140,000 \times 0.10 = 14,000$$
 Btu

$$140,000 + 14,000 - 154,000$$
 Btu Current, 1 kw-hr.

$$= 56.88 \times 60 = 3412$$
 Btu

If the solution is to be heated to the required temperature,  $210^{\circ}$ F in 1 hour, then the amount of current necessary would be 154,000/3412 = 45.1 kilowatts.

A rapid approach to the solution of this problem would be by the use of the graph shown in Fig. 48. The gallons of water heated per kilowatt-hour is plotted against temperature increases in degrees Fahrenheit. Calculations for simplicity, are based upon the use of a specific heat of one for the cleaning solution. The specific heat of a substance refers to the ratio of the number of calories required to raise the temperature of a gram of a substance one degree centigrade, compared to the number of calories required to raise that of a gram of water one degree centigrade. The solution for the cleaning tank example is as follows: The temperature difference is 150°F. Where the vertical line, beginning at the bottom of the graph marked 150,

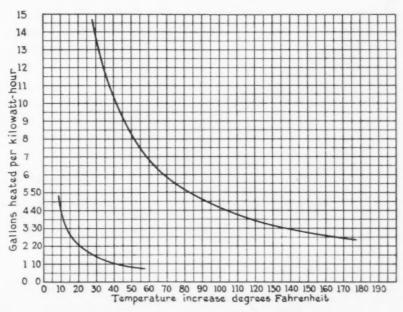


Fig. 48. Water heating. Curve based on 100% efficiency.



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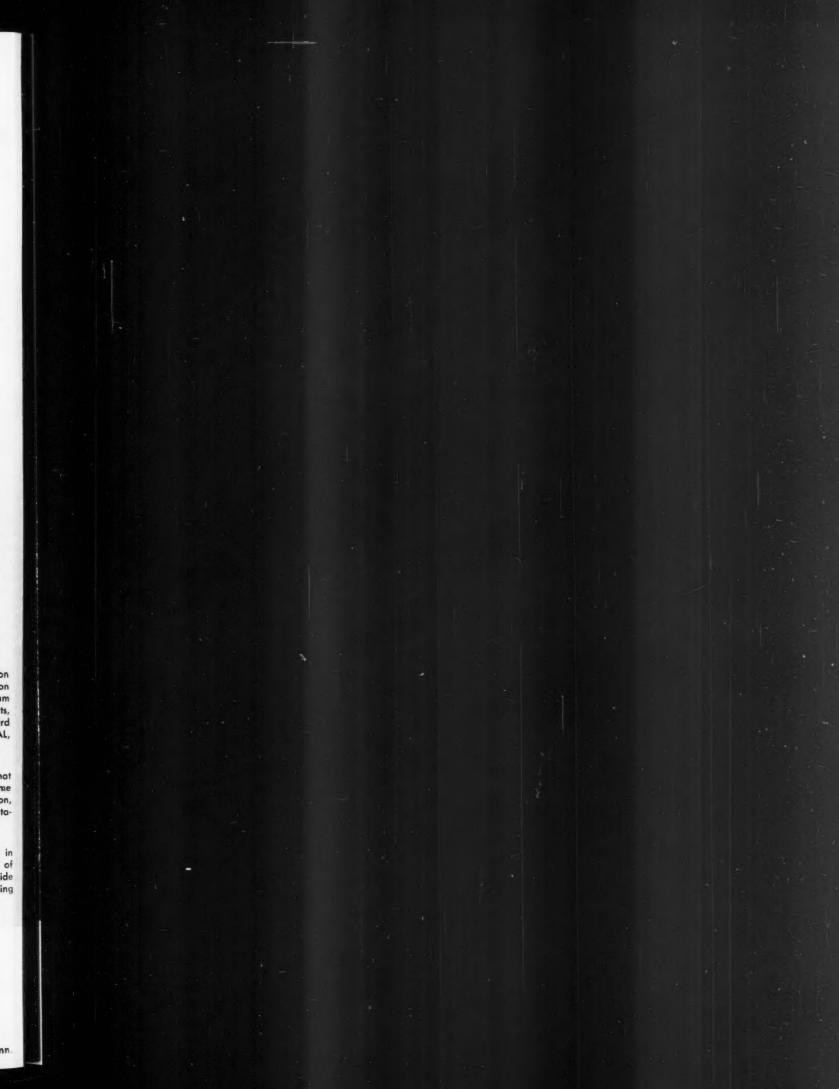
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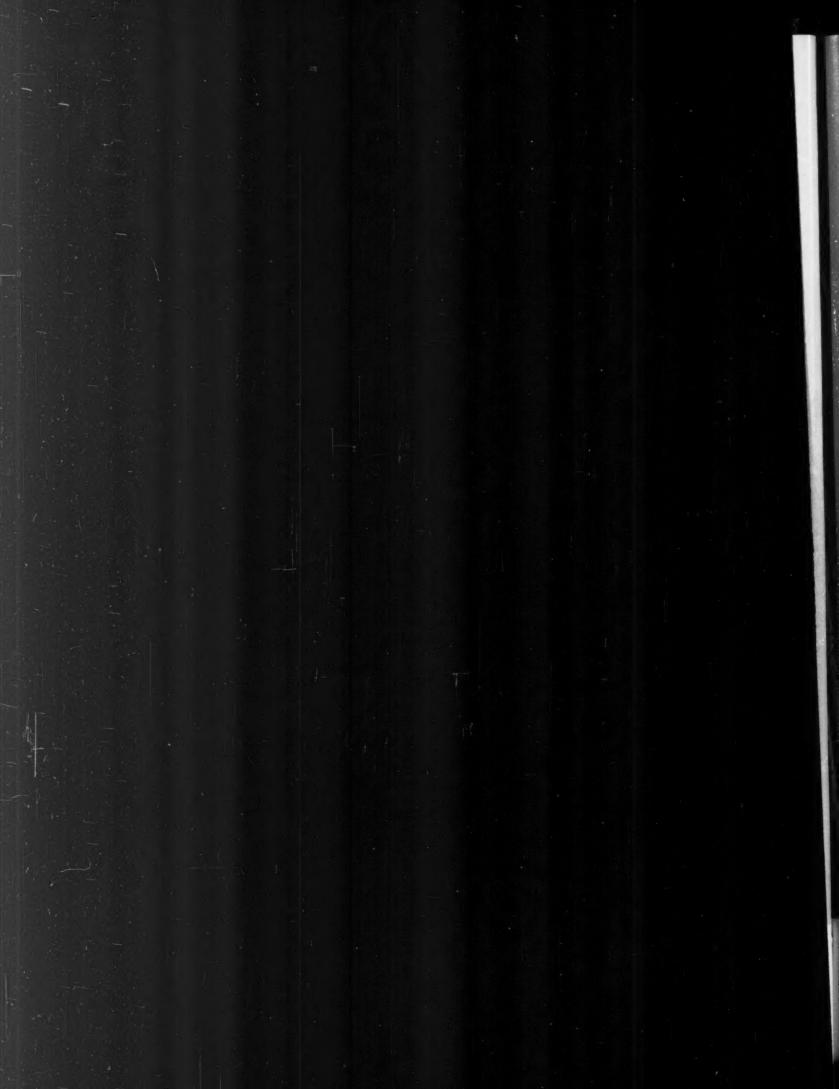
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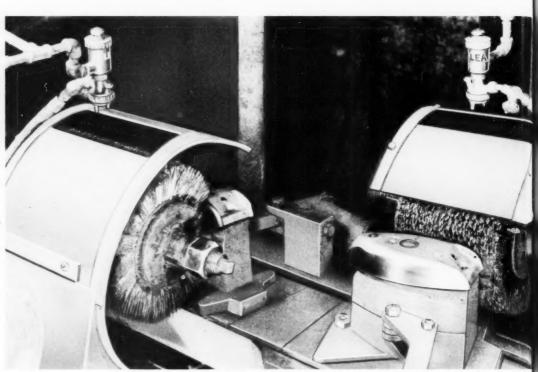
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crosses the curve, extend a horizontal line to the left. It will be observed that this crosses the gallons heated per kilowatt-hour line at approximately the 2.7 mark on the scale. Hence, the graph shows that 2.7 gallons will be heated 150°F. in one hour by one kilowatt. To raise the temperature of the solution (112 gals.) 150°F. in one hour would require

112/2.7 = 41.5 killowatts Heat loss, 10% = 4.1 killowatts

Total = 45.6 killowatts

A more detailed graph, and the correct specific heat value for the solution, which would be less than one, thereby requiring less energy than that for water, would bring the number of kw closer to the calculated value of 45.1 kw.

The addition of sulfuric acid to decrease the resistance of an acid copper solution presents a study in heating if the applied voltage (emf) to the bath or the amount of current for the tank is varied. The current flow through the bath with a resistance of 0.1 ohm under an applied emf of 5 volts would be

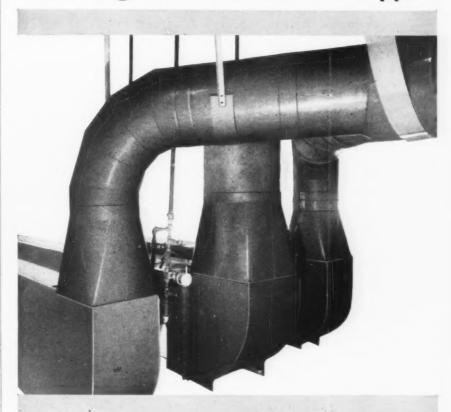
$$I = \frac{E}{R} = \frac{5}{0.1} = 50$$
 amperes. The heat

produced in 5 minutes would be  $H=0.24I^2Rt=0.24\times50\times50\times0.1\times5\times60=18,000$  calories. If the addition of the acid reduces the resistance (increasing the conductivity) of the bath to 0.05 ohm, the same voltage will result in a current flow

of I 
$$=\frac{E}{R}=\frac{5}{0.01}=100$$
 amperes.

For the same time, 5 minutes, H =  $0.24 \times 100^2 \times 0.05 \times 5 \times 60 =$ 36,000 calories. If the current is kept at 50 amperes with the resistance remaining at 0.05 ohm, then the applied emf necessary would only be E = IR  $=50 \times 0.05 = 2.5$  volts and the heat produced for the same 5 minute period would be H =  $0.24 \times 50^2 \times 0.05 \times$  $5 \times 60 = 9{,}000$  calories. The addition of sulfuric acid to the acid copper bath will result, therefore, in a decrease in resistance, but an increase in the amount of heat produced if the same voltage (increase in current) is applied; and a decrease in the amount of heat produced if the same current is maintained (decrease in applied voltage).

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#### SHOP PROBLEMS

ABRASIVE METHODS SURFACE TREATMENTS CONTROL ELECTROPLATING CLEANING PICKLING TESTING



METAL FINISHING publishes, each month, a portion of the inquiries answered as a service to subscribers. If any reader disagrees with the answers or knows of better or more information on the problem discussed, the information will be gratefully received and the sender's name will be kept confidential, if desired.

#### Tetrachromate Bath

Question: Please let me know if the "Bornhauser chrome solution" (July 1952 issue) is patented in the United States

J. A. V.

Answer: A similar solution containing tetrachromate, plus a catalyst such as sulfate, fluoride, and fluosilicate, was patented by Mardick (U.S. Patent 2,095,995. Oct. 19, 1937). This patent has expired and is in the public domain.

#### **Dulling Bright Nickel Surfaces**

Question: A customer requires a dull nickel plate on brass components consisting of rods, tubes and plates. These parts do not lend themselves to barrel finishing. We have only a bright nickel and must dull the coating down after plating.

An anodic etch is undesirable because the parts must be plated to specification. A brush finish is not sufficiently dull. The ideal method of dulling the plate would be with some sort of chemical dip. Can you offer any suggestions?

W. J. M.

Answer: The nickel surface can be dulled by immersion in a solution of equal parts 40 deg. Baumé ferric chloride solution and muriatic acid. However, this method suffers from the same disadvantage as an anodic etch, namely removal of an appreciable amount of metal.

The most effective method of dulling a bright nickel deposit is to abrasive blast.

#### Plating Silver on Silver

Question: Would you please advise us about the correct procedure to

eliminate laminating silver plate on silver. Our usual preplate cleaning that we use when plating silver on steel doesn't work as it turns the silver black. We first degrease the parts; mask them; clean with reverse current in a caustic cleaner; use an acid dip; strike and then plate. Of course there is a thorough rinse between each operation. When trying to plate silver on silver, as soon as the reverse current hits the part the silver turns black and the acid does not remove the scum.

We would appreciate any help you can give us on this.

S. C.

Answer: A reverse current steel cleaner is not suitable for silver. The parts should be immersed in the cleaner without current, then rinsed and scratch-brushed with pumice and water. A cyanide dip may follow before the silver strike. Instead of scratch-brushing, reverse current at about 2 volts for a few seconds in a solution of 8 oz./gal. sodium or potassium cyanide may be satisfactory.

#### **Rapid Nickel Plating**

Question: We have come across the following formula for a nickel solution, for which is claimed a deposit of 0.001" in less than half an hour:

Requires agitation.

This is the only time we have come across the use of sodium fluoride in nickel baths and are rather reluctant to base ourselves on the one source. Moreover, this source also indicates the use of lead lined tanks which we understand to be incorrect where NiCl<sub>2</sub> is employed.

We are equipped with PVC lined tanks which solve that problem. However, the question of heating of the bath is somewhat of a problem. In our present plating bath with 45 g./l. of NiCl2 we are having severe corrosion troubles on stainless steel heating coils, so if lead could effectively be used in heating of that solution this would be another problem solved. If you can recommend the use of this bath, can you also supply us with instructions for determining the concentration of NaF by analysis, as we have been unable to locate any instructions on this point.

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Answer: We would not recommend the addition of sodium fluoride to a nickel bath because the addition of sodium ions will affect the ductility of the deposit. The fluoride will combine with the boric acid in the bath to form fluoboric acid. If the solution is operated with bagged anodes, and is agitated and filtered, no additions are necessary to deposit at rates greater than 0.001" in ½ hr.

Lead-lined tanks are considered undesirable because some lead dissolves, adversely affecting the deposit. Stainless steel coils will dissove but lead coils are very commonly employed. The small amount of lead dissolved from the coil ordinarily does not affect the nickel deposition; however, the nickel chloride content of the bath should be maintained at not over about 8 oz./gal.

#### Rusting of Zinc Plated Steel

Question: We are now starting to plate zinc and would appreciate whatever information you can give on what is wrong with the zinc plating of the samples enclosed. It seems that there is not enough protection since they are easily rusted. We hope that you will be able to give us a rundown on how to produce a good pro-

tective finish and appearance. We are now using a proprietary bright zinc formulation.

L. F. Z.

Answer: Zinc is a sacrificial metal so that, to obtain increased rust resistance of plated parts, it is necessary to apply a heavier zinc deposit to the

The sample forwarded has only a flash coating of zinc whereas, for protection, it should have at least 0.0002" and preferably much more. If it is not possible to secure a heavier deposit from your bath, we would suggest that it be analyzed by your brightener supplier.

#### Nickel Bonded Diamond Burrs

Question: I am interested in the manufacturing of grinding tools suitable for the field of dentistry. I would appreciate your assistance in obtaining the process for the method in which the diamond grains are firmly bound to the basic metal by means of a chrome-nickel film (electroplating).

I am enclosing a sample instrument for your inspection and analysis, to assist you in determining the process I am looking for.

S. A.

Answer: Nickel-bonded diamond wheels and burrs are made by immersing the spindle in a Watts nickel solution, the spindle being surrounded by a small bag containing the diamond powder. The diamond powder can also be placed in small cavities drilled in a block of plastic, one spindle being suspended in each cavity. A small amount of agitation is desirable and a low current density is used until the amount of nickel plate is built up. After the proper amount of nickel has been applied, the part is chromium plated, as usual.

#### **Electroless Gold Plating**

Question: We are interested in small batch electroless gold plating and would appreciate receiving any information you can supply on the process, also the names of concerns supplying the chemicals.

A. P.

Answer: We know of no electroless gold plating process which would be similar in its action to that of electroless nickel. The immersion gold processes are displacement methods, in which the action ceases as soon as the base metal is covered with gold. They

are limited, therefore, to very thin flash coatings. The so-called "electroless" process will build up thick deposits.

#### **Etching Aluminum**

Question: We are currently engaged in a photoetching process on aluminum plaques and trophy rings, using an Eastman photo resist top and an etching medium. We would like to change this medium, which is at present hydrofluoric acid, to ferric chloride since it reduces attack upon the top and provides a cleaner and deeper etch. The ferric chloride, however, leaves a dark smut embedded in the etch. Can you assist us with a means of removing this smut?

D.B.

Answer: If the aluminum parts contain silicon, it will be necessary to use hydrofluoric acid to remove the etching smut. However, if wrought aluminum is used, a dip in a solution of 1 part nitric acid and 3 parts water should be satisfactory. A solution of 1/2 pint sulfuric acid and 4 oz. sodium dichromate per gallon of water can also be used.

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#### Patents

RECENTLY GRANTED PATENTS IN THE METAL FINISHING FIELD



#### **Abrasive Blasting**

U. S. Patent 2,724,930, Nov. 29, 1955. W. M. Oddie.

Apparatus for abrasively treating metal articles including means for projecting a stream of abrasive particles, an endless conveyor element having a feed point, a tumbling point and a delivery point, means for driving said conveyor in a constant direction, means for suspending said conveyor element to provide an upwardly concave support, the conveyor element being arranged to advance the articles in a linear direction from the feed point through the tumbling point to the delivery point in-line with the direction of travel of the conveyor element, means being provided at the feeding point for feeding articles to be treated on to the conveyor element, means associated with the conveyor element arranged to control the operation of said means for feeding articles to be treated on to the conveyor element, means being provided associated with the conveyor element for stopping the projection of the stream of abrasive particles.

#### **Buffing Wheel**

U. S. Patent 2,724,937. Nov. 29, 1955. G. R. Churchill.

A buffing wheel section having radially extending buffing elements and a hub member to which the buffing elements are secured at their inner ends. said buffing elements being disconnected from one another for a major portion of their length inwardly from the periphery of the buffing wheel section, whereby to enable the buffing elements to individually flex during a buffing operation, each buffing element comprising an assembly of twisted strands of fibrous material extending longitudinally of the bufflng element; and a fibrous wrapper enclosing said assembly and having longitudinal stitching extending therethrough and subdividing the assembly into separate groups of strands and compressing

said groups transversely and imparting an elongated cross section to said buffing elements in a direction generally perpendicular to the axis of the buffing wheel section, the separate groups of strands cooperating with one another to impart rigidity to the individual buffing elements to resist deflection in use, and the wrapper and stitching maintaining said groups of strands in substantially the same relative relation throughout the life of the buffing elements.

#### Waste Treatment

U. S. Patent 2,725,314. Nov. 29, 1955. L. E. Lancy.

In an integrated in-line process for substantially completely removing toxic material and waste carry-over from work pieces being chemically processed in a treatment line, the steps of preparing and maintaining a toxic material and waste neutralizing chemical solution; applying such solution directly to surfaces of the work pieces and to toxic material and waste carried-over by the work pieces from a toxic treatment zone, while moving the work pieces directly from the toxic treatment zone into and through a toxic material and waste removing zone; substantially completely chemically neutralizing and removing the toxic material and waste carry-over from the surfaces of the work pieces by applying the neutralizing solution thereto within the removing zone; constantly collecting, enriching and reusing the toxic material and waste neutralizing chemical solution, while advancing and treating the work pieces in the above-defined manner; moving the work pieces from the removing zone and only subsequently into and through a washing zone, and applying wash water in the washing zone to the surfaces of the work pieces and removing therefrom nontoxic carry-over from the toxic material and waste removing zone, so that the wash water will contain only innocuous material and may thus be directly discharged as sewage without stream contamina-

#### **Electropolishing Method**

U. S. Patent 2,725,352. Nov. 29, 1955. H. R. Strobel, assignor to Western Electric Co., Inc.

The method of dissolving surface projections, electropolishing and passivating metallic tapes having serrated edges, which comprises advancing a filamentary cathode longitudinally along a predetermined path through an electrolytic bath, advancing such a metallic tape longitudinally through the bath along a path which progressively approaches the path of the cathode from the entrance end to the exit end of the bath, masking the edges of the tape with electrical insulating material to prevent electrolytic action on the serrated portions thereof, and creating a substantially constant potential difference between the cathode and the tape to electropolish the surface of the tape in the initial portion of the bath and ultimately to passivate said surface near the exit end of the

#### **Electropolishing Copper**

U. S. Patent 2,725,353. Nov. 29, 1955. H. R. Strobel, assignor to Western Electric Co., Inc.

The method of electropolishing copper articles, which comprises making a copper article an anode in an electrolytic cell including an aqueous bath consisting essentially of from about 18% to about 30% copper nitrate, from about 6% to about 2% sulphuric acid and the balance water, and impressing a D.C. potential upon the cell of sufficient magnitude to maintain an average anode current density of at least 3,000 amperes per square foot and to simultaneously release sufficient oxygen from the bath around the article to passivate the surface thereof with copper oxides and highly polish the surface of the article beneath the oxides.

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#### **Electropolishing Method**

U. S. Patent 2,725,354. Nov. 29, 1955. G. E. Murray, assignor to Western Electric Co.

The method of electropolishing metallic filaments, which comprises continuously advancing a metallic filament longitudinally along a predetermined straight path through an electrolytic bath, advancing a pair of flat metal tapes through the bath along straight paths converging with respect to the path of the filament and on opposite sides thereof from the entrance end to the exit end of the bath, progressively bending the tapes transversely into a tube surrounding the filament as they are advanced along said paths thereof, and creating a sufficient difference of potential between the filament and the tapes to polish the surface of the filament.

#### **Electropolishing Method**

U. S. Patent 2,725,355. Nov. 29, 1955. A. N. Gray, assignor to Western Electric Co., Inc.

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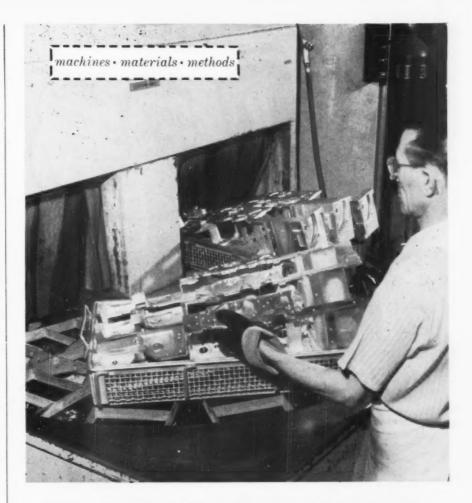
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An apparatus for electropolishing articles, which comprises a tank containing an electrolytic bath, a cathode extending generally across the tank, means for advancing an article to be electropolished through the tank along a path substantially parallel to the cathode from the entrance end of the tank to the exit end thereof, means for impressing a difference of potential across the article and the cathode so that current flows from the article to the cathode, a nonconductive mask interposed between the cathode and the article, said mask being so perforated that a progressively increasing area of the cathode is exposed thereby to the article as the article is advanced from the entrance end to the exit end of the tank.

#### High Voltage Electroplating Method

U. S. Patent 2,726,203. Dec. 6, 1955. S. C. Rockafellow, assignor to Robotron Corp.

In a process for electroplating a metal from the group consisting of copper and cadmium onto a base member the step comprising: supplying electrical energy to the plating electrodes in a series of uni-directional pulses wherein each of said pulses constitutes a portion of successive half-



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waves of one polarity of an alternating current wave-form, each of said pulses beginning with respect to each halfwave after the high point thereof and ending at the first following point of zero potential.

#### Portable Sand Blaster

U. S. Patent 2,725,684. Dec. 6, 1955. D. L. Growe.

Apparatus for spraying granular material comprising a cruciform blast header, first and second oppositely projecting and axially aligned ducts formed within said header, a third and downwardly projecting duct leading from a point medially of said axially aligned ducts, a pressure sealed container having a top closing mem-

ber pieced by said third duct, a fourth duct comprising an elevator tube traversing the length of said container and piercing the bottom thereof and joined at its upper end to said third duct, a plurality of material entry ports positioned upon said fourth duct near its point of exit but within the bottom of said container, a first adjustable valve having an outlet port connected to the lower end of said fourth duct, a fifth duct having its output end connected to the input port to said first adjustable valve, a check valve incorporated in said first valve arranged to prevent any substantial flow of granular material or air backward therethrough, a sixth duct leading from a junction with said fifth duct and passing into said container near the top portion thereof, a seventh duct connected at its output end to the input end of said fifth duct, an eighth duct connectable at its input end to a source of air under pressure, a manually operable valve positioned medially along said eighth duct and arranged to control the passage of air therethrough, a second adjustable valve, connections joining the output of said eighth duct to the input of said second valve, connections joining the output of said eighth duct also to the input of said seventh duct, connections joining the output of said second valve to the first said aligned duct of said blast header and a blast nozzle having its input end connectable to the second duct of said blast header.

#### Iron Ion Control in Lead Coating Bath

U. S. Patent 2,726,175. Dec. 6, 1955. F. E. Kendall and J. R. Kusa, assignors to Steel Ceilings, Inc.

In a method of forming a lead coating on a ferrous article wherein such article is immersed in a bath comprising a water solution of a lead salt of an aliphatic poly-basic hydroxy acid having a pH of from about 4.5 to about 6.5, a lead ion concentration of from about 3 to about 50 grams per liter, a solubilizing agent for such lead ion capable of forming a soluble complex therewith, and an operating temperature of from about 70°F. to boiling for a time sufficient to deposit an appreciable lead coating on such article by a chemical displacement reaction, the method of prolonging the effectiveness of such bath which comprises oxidizing ferrous iron which enters such bath as a result of such displacement reaction to the ferric state, and precipitating the ferric iron from solution by reaction with a salt selected from the class consisting of the ammonium and alkali metal fluorides and bifluorides.

#### Method for Plating by Condenser Discharge

U. S. Patent 2,726,202. Dec. 6, 1955. S. C. Rockafellow, assignor to Robotron Corp.

In a method of utilizing an alternating potential for electro-plating a metal chosen from the group consisting of copper and cadmium onto a base member from an electroplating electrolyte in which the metal to be plated is dissolved and in which the base member is immersed, said base member being one of a pair of spaced electrodes and the other of said electrodes also being immersed in said electrolyte, the steps comprising: supplying electrical energy to the plating electrodes in a series of unidirectional pulses obtained by storing electrical energy from repeated negative halfcycles of said alternating potential; adding the potential of said stored energy from each negative half-cycle to the potential of the immediately subsequent positive half-cycle of said alternating source; and conducting the resulting potentials through said plating until a selected quantity of electrical energy has been conducted therethrough; controlling the magnitude of said stored energy by controlling the portion of said negative half-cycle which is stored; and further controlling the magnitude of current through said plating bath by controlling the portion of said positive half-cycle which is added to said stored energy.

#### Anodic Pickling and Nickel Plating of Tank Interior Using Single Electrolyte

U. S. Patent 2,726,201. Dec. 6, 1955. W. H. Prine, assignor to The International Nickel Co.

A process for electrolytically depositing a thick, corrosion-resistant laver of nickel on the interior surface of a large steel tank in situ which comprises, in combination, the steps of assembling and suspending an electrode structure in the cavity defined by the interior surface of said tank, filling said tank with an aqueous acid nickel-plating electrolyte having a pH of about 1 to about 4.5 and containing about 150 to about 500 grams per liter of nickel sulfate, about 20 to about 65 grams per liter of nickel chloride and about 15 to about 45 grams per liter of boric acid, passing an electric current for at least 15 seconds through said tank, electrolyte and electrode structure in a direction such that the interior surface of said tank contacted by said electrolyte becomes the anode and is anodically pickled over substantially all portions thereof simultaneously, subsequently passing an electric current through said tank, electrolyte and electrode structure in a reverse direction such that the interior surface of said tank contacted by said



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electrolyte becomes the cathode and nickel is electrolytically deposited over substantially all portions thereof simultaneously, maintaining the current in the latter direction until a corrosionresistant layer of nickel of a thickness of at least about 0.01 inch is built up by electrolytic deposition on substantially all portions of the interior surface of said tank contacted by said electrolyte, and removing said electrolyte from said tank, whereby a thick, corrosion-resistant laver of nickel is electrode-deposited on the interior surface of said tank while using the same acid nickel-plating electrolyte for the dual purpose of anodically pickling and of electroplating the interior surface of the tank without emptying the

electrolyte from the tank between the pickling and plating operations.

#### Electroless Nickel

U. S. Patent 2,726,969. Dec. 13, 1955. R. A. Spaulding, assignor to General Motors Corp.

In a chemical reduction plating operation utilizing a plating bath comprising an aqueous solution containing a water-soluble nickel salt and hypophosphite reducing agent, the improvement which consists of maintaining the desired nickel concentration in the bath by additions thereto of a water-insoluble nickel compound adapted to regulate the bath pH, and simultaneously removing phosphite by-products formed during plating by

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treating said bath with an anion exchange material.

#### **Electroless Nickel**

U. S. Patent 2,726,968, Dec. 13, 1955. R. A. Spaulding, assignor to General Motors Corp.

In a chemical reduction nickel plating process utilizing a plating bath comprising an aqueous solution containing a water-soluble nickel salt and a hypophosphite reducing agent, the improvement which consists of replenishing the hypophosphite in said bath by addition of hypophosphorous acid and treating said bath with an anion exchange material to remove phosphite ions produced by said process.

#### **Belt Polishing**

U. S. Patent 2,726,491. Dec. 13, 1955. J. Smedley, assignor to Rolls Royce

In apparatus for surface finishing a curved surface comprising a work holder adapted to receive the part to be surface finished, and a flexible abrasive carrier, said work holder and flexible carrier being mounted for relative finishing movement with the said part carried in the work holder in contact with the flexible carrier; means to supply a pressure fluid to the opposite surface of the abrasive carrier to that in contact with the said part comprising a member positioned adjacent said opposite surface so that

the carrier is between the work holder and said member, said member having internal passageways and a portion of its external contour shaped in predetermined relation to the desired form of the surface to be finished, means to deliver pressure fluid to said internal passageways of the member, and a plurality of outlets from said internal ducts opening through said contour portion of the member, said outlets being disposed in said contour portion of the member in a manner uniformly to distribute the pressure fluid to said opposite surface where the abrasive carrier contacts the part to be finished.

#### **Conversion Coating for Zinc**

U. S. Patent 2,727,841. Dec. 20, 1955. A. E. Chester, assignor to Poor & Co.

A process of protecting zinc against corrosion which comprises treating a zinc surfaced article with an aqueous solution consisting essentially of 0.5 to 5% by weight HNO3, 1.82 to 9.1 grams per gallon of CrO3 and 1.59 to 7.95 grams per gallon of fluorine in the form of a water soluble fluorinecontaining compound from the group consisting of trifluoroacetic acid and the lower alkyl esters of said acids.

#### VENTILATION

(Continued from page 80)

maintain more comfortable conditions by keeping humidity and heat down at the working level. Such a canopy has been used to maintain proper humidity within a larger area where precision steel parts were being processed.

For a single tank or hot tanks along a wall, an over-hanging canopy, as in Figure 4, has been used. An air flow of 150 feet per minute is recommend. ed to overcome excessive losses from normal drafts in a large room. The

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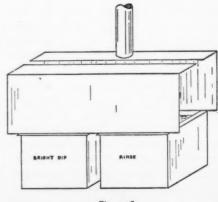


Figure 6

worker may work either inside or outside the canopy.

One of the most difficult ventilation problems is for the highly toxic fumes generated by sulfuric-nitric bright dipping of copper alloys. Even a ventilation rate of 300 may not be adequate without baffling and partial hood enclosure, as in Figure 5. It will also be helpful to keep the solution level low in the tank in order to gain some baffling from the sides of the tank. Even with such a design, fuming of the work on removal and transfer to the rinse may be objectionable. This problem has only been solved in some cases by the use of a more complete enclosure, as in Figure 6, over the bright dip and the rinse. A monorail and hoist can be used with the split hood, or a monorail can be placed inside of a similar hood with a closed top. For less severe conditions, a narrow tank, a high air velocity, and a hood extended beyond the ends of the tank may be helpful.

#### **ABSTRACTS**

#### Bulk Anodizing and Coloring of Small Parts in Bulk

C. Etienne: Revue de L'Aluminium, January 1955.

The desire has long existed to apply the methods used for barrel plating of small parts to the anodizing treatment of light metal components of small size in bulk, but it is only within the last few years that this conception has become a practical commercial proposition. The technical problem to be overcome was the fact that the coating which is formed on the metal surface during the treatment has a low electrical conductivity. Consequently, with a bulk mass in the barrel during anodizing, parts will be constantly removed from the electrolysis circuit. For this reason, as a development conception, it was useless to think of utilizing rotary barrels or drums in which the parts had free circulation. On the contrary, it was rapidly realized that the parts should be maintained immobile in a basket.

After numerous tests, two types of container baskets were developed of which full dimensions and diagrams are given in the text; one type was a



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truncated cone and the other had a cylindrical shape. The truncated cone type of basket was used for parts of small dimensions, less than about 10 mm. The inverted truncated cone shape was developed because parts which have been freshly pickled heap very badly because of the high surface friction. Too low a conicity will not improve the heaping characteristics and, on the other hand, too great a conicity will give correct heaping but will necessitate strong cover closure to avoid movement which may give rise to deformation.

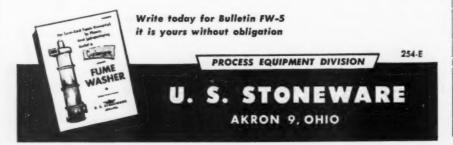
When this question of the baskets had been settled, two other technical problems remained to be overcome. These were: rapid heating of the electrolyte in the interior of the basket and the accumulation of gas in the interstices left between the parts. This temperature rise should not exceed 23°C, when a sulfuric acid electrolyte of 19° to 22° Be. is being used. Higher temperatures act adversely on the coating. After tests on an industrial scale, the following simple measures were adopted to ensure the cooling of the electrolyte in the anodizing baskets. These comprised (a) Introduction of cold electrolyte to the interior of the basket by means of a tube fixed on the axis with holes 2 to 2.4 mm. in diameter, the electrolyte feed being distributed uniformly along the tube: the feed speed should not be too high so as to displace the parts; (b) By injection of compressed air to the interior of the tube under a pressure of



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100 to 150 g./sq. cm. In this case, the electrolyte is renewed by convection in the interior of the basket and it is likewise cooled to a certain extent by the compressed air. Although this method is less effective than the previous one, in many cases it is quite adequate; (c) By displacement of the basket during the course of the anodizing operation, along the anode bar, the operation being gently effected at 5 to 10 minute intervals. During the course of its displacement the basket should be entirely lifted out of the bath in such a way as to eliminate completely the hot electrolyte before it is immersed again in the bath.

The gases which are formed at the anode during electrolysis are constituted of oxygen not fixed by the metal and of hydrogen resulting from the attack of the constituents of the alloy by the sulfuric acid. These gas bubbles can grow to a diameter of several mm. and, if they adhere to the surface of the parts, serve to insulate these. The methods described above for cooling the electrolyte serve also to remove these gas bubbles.

#### Electrolytic Degreasing before Plating

L. Ades: *Galvano* (Paris). Vol. 24, No. 220, pp. 17-19.

Although a prior solvent degreasing or a prior alkaline cleaning is necessary to give a preliminary cleaning to the ware it is indispensable to follow this by an alkaline electrolytic treatment before plating. The parts are immersed in the electrolytic degreasing bath for a time which is generally lower than that necessary for chemical degreasing. The baths are heated but generally to lower temperatures than those for chemical degreasing baths. Before the development of the semi-bright and bright plating modern baths, it was the general rule to apply a cathodic degreasing treatment. Today it is most usual to apply cathodic and anodic degreasing treatments or even cathodic treatment followed by an anodic degreasing according to circumstances, both the processes having advantages and disadvantages.

A great diversity of compositions are used for the hot electrolytic alkaline baths and each metal needs a special bath composition to obtain the best results. An alkaline electrolytic cleaner should have properties

analagous to those of baths of chemical degreasing but additionally special important properties as follows:

(1) Its pH value needs careful study so as to confer high detergent and saponifying properties but also to avoid the attack of metals which are attached either to the positive or negative pole in the bath. The common baths generally have a pH between 10 and 12.5. The use of soda increases the saponifying properties but does not modify the detergent properties. The risks of chemical attack increase. however, since in very low quantities it favors a rapid rise in pH. It is necessary to use it to ensure a good conductivity and, accordingly, silicates are used as inhibiting agents. The various silicates used diminish the attack on metals by sodium carbonate and sodium orthosilicate.

(2) The bath must also possess a very low surface tension to facilitate the penetration of the solution into the grease skin and detach it. Alkaline soaps or surface-active compounds are introduced to reduce the surface tension. However, their use is limited in all cases, because pronounced foaming must be avoided with the operation of the bath. The introduction of orthophosphates favors the surface-tension action of these agents and increases the detergent and emulsifying properties of the solution.

(3) Finally, an electrolytic degreasing bath should be insensitive to the hardness of the water. To obtain this effect, complex agents are introduced into the bath such as hexametaphosphate, tetraphosphate, polyphosphate and pyrophosphate.

(4) An electrolytic degreasing bath should not leave any deposit on the parts such as a film difficult to eliminate by rinsing. This is why it is important to terminate the degreasing cycle with an anodic operation.

#### Influence of Chlorine Ions on the Solubility Mechanism of Nickel Anodes in Sulfate Baths

W. Machu and A. Ragheb: Werkstoffe und Korrosion. Vol. 5, No. 6, pp. 217-222.

The authors investigated the anodic behavior of nickel in nickel sulfate solutions with and without the addition of ammonium chloride and nickel chloride. The best method for the preparation of the test electrodes and hen you deal with Federated sales and service engineers you'll find their talk of extra service is more than just lip service. As an example, Federated provides free bath analysis for plating shops that wish to use Zimax, the efficient addition agent for zinc plating; and free adjuster solutions are provided with Cadmax, Federated's effective brightener for cyanide cadmium plating, so that no break-in period is required.



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the most effective removal of the surface oxides consists in an anodic pretreatment in N HCl at 0.3-0.4 amp./sq. cm. With higher anodic current densities, anodic polishing occurs and, with lower ones, only etching of the nickel and insufficient surface cleaning. An addition of ammonium or nickel chloride increases the porosity of the primary cover coating present on the nickel and, through this, improves the solubility of the nickel anodes.

From the Mueller-Machu log. i<sub>o</sub>/log. t<sub>p</sub> curves, the porosities of the cover coatings in the various electrolytes could be calculated and the influence of the chloride ions could be quantitatively determined. Mixtures of nickel sulfate and nickel chloride behave in a varying manner in comparison with

nickel sulfate or nickel chloride, hydrochloric acid and sodium chloride alone; they show a very great activation characteristic and, with the anodic treatment, they allow only the formation of very porous and unstable cover coatings. Further, the formation of oxide coatings with anodic polishing was proved.

#### Electrical Conductivity Measurements on Plated Metal Coatings

By A. Keil: *Metalloberflaeche*. Vol. 9, No. 6, pp. A81-A84 (June 1955).

The electrical conductivity of electroplated metals lies, in general, below that of the same metal in the massive condition (i.e. cast or rolled). In addi-

tion, it is to a great degree dependent on the bath additions or impurities which occur simultaneously with the deposition. The requirements for the establishment of precise physical data in this connection has today become of great technical significance to the electronics industry in which high frequency techniques are employed and in which high-corrosion resistant noble metal plated coatings are often applied. In these plated coatings, as a result of the "skin effect," a considerable part of the electrical conductivity of the equipment occurs. For instance, in the short-wave radio and radar equipments, the normal wave lengths used give a penetration depth of the order of 10 microns. The investigational work to obtain precise information on this question covered silver, gold and rhodium plated coatings which were produced by the normal plating methods. The conductivity measuring process applied by the eddy current method permitted of obtaining fundamental conclusions regarding the electrical conductivity of test parts of 0.5 to 15 microns in thickness and with a measuring surface area size of at least 1 sq. cm. The metal plated films examined were obtained by plating and then dissolving away the base metal.

The measurements obtained allowed of the following conclusions being drawn. On working with normal commercial plating baths and under the conditions of practical operational plating, both with gold and also with silver, one can count on a certain lowering of the electrical conductivity as compared with the physical data available for the cast metal condition. Thus, in the case of gold, about half the normal electrical conductivity was measured with the plated gold coating. With silver plated coatings, these values lie between 50 and 90% but can, however, if hardening additions are contained in the plating bath, sink to 10% for the specific conductivity.

The most unfavorable relationships for the pure plated-out metals were found with rhodium and, in this case, only about 25% of the normal electrical conductivity was attained. It has also to be considered in this connection that, with the ductile test bodies produced with these tests, undoubtedly more favorable conditions had been created than occur with the plating treatment of more rigid bodies in

practice. This fact is connected with the high internal stresses and with the micro-cracks caused by this in the plated coating and is a proof of the fact that it does not appear advisable, to specify rhodium coatings in too great a coating thickness. Inasmuch as the commercial processing specifications may call for the production of a thick surface coating which is simultaneously corrosion resistant, firmly adherent, has a good electrical conductivity and wear resistance, then the problem cannot be solved by merely making the rhodium plated coating thicker.

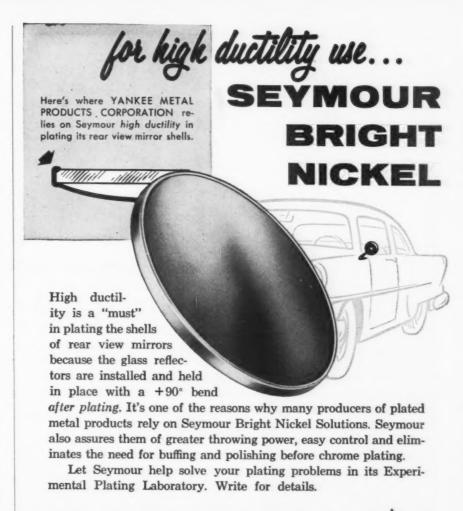
The best solution of a complex technical problem of this nature would appear to be to apply a silver or gold plating pre-treatment followed by rhodium.

#### Plated Nickel Coatings from Chloride and Sulfate Solutions

By E. Raub: *Metalloberflaeche*. Vol. 9, No. 6, pp. 88A-93A.

According to the extensive previous research which has been conducted, the characteristics of nickel plated coatings are more dependent on the composition of the plating baths than on the working conditions such as cathodic current density, bath temperature, etc., as long as the pH value remains within the normal limits of nickel plating practice. With higher pH value the hardness increases as a result of the increasing occlusion of nickel hydroxide and basic nickel salts. The present investigation had the object of ascertaining the influence of chloride in the bath on the nickel plating process. For the tests, there were used pure chloride and sulfate baths with boric acid addition as well as mixed baths. Before the tests the baths were subjected to prolonged electrolysis at low current densities.

Hardness determinations were conducted on the nickel plate with the Hanemann Micro-Vickers hardness tester. The thickness of the nickel coating amounted to 20 and 50 microns respectively. It should be mentioned that the Micro-Vickers hardness merely gives comparative values. X-ray fine structure examination was also conducted on 5 to 20 micron deposits.



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The results of these tests showed that the nickel separates out from nickel chloride solutions with a lesser polarization than from nickel sulfate solutions. Corresponding to this, the current efficiency with the nickel deposition from the chloride baths and chloride - containing baths is greater than that from nickel sulfate solutions. The nickel plated from chloride solutions under corresponding working conditions possesses a definitely higher hardness than nickel obtained from sulfate solutions. The occlusion of nickel hydroxide and basic nickel salts respectively under the same working conditions, is greater with nickel deposits from the chloride baths than those from the sulfate baths. The differences between the chloride and sul-

fate solutions rest on the fact that nickel chloride is strongly dissociated and sulfate weakly dissociated. Simultaneously, the hydrolysis constant of nickel chloride is very much greater than that of the nickel sulfate, therefore the stronger tendency to the formation and co-precipitation of nickel hydroxide and basic nickel chloride.

Nickel deposits can also show a high hardness if they are deposited with simultaneous relatively high hydrogen generation. In this case the occlusion of hydrogen can be assumed as the cause of the increased hardness which, in the same way as with highly dispersed occluded inorganic or organic compounds, cause lattice disturbances with the crystallization of the nickel.









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#### Some Problems with Electrochemical Polishing of Aluminum and Aluminum Alloys

F. Baumann: Angewandte Chemie. 66, No. 21, p. 682.

It can be accepted that the electrolytic effect in electrochemical polishing of aluminum is induced by the external current circuit, and with the chemical brightening processes by way of local cell action. With the Erft-Werkes dissolving process, thick oxide coatings are applied and again dissolved off. Lead nitrate, copper nitrate as well as depolarizers increase the brightening process; the behavior of the alloying constituents is varying and is difficult to follow and control.

#### Venting and Fume Removal Equipment in Metal Working Processes

H. Muermann: *Metall*. Vol. 9, No. 7/8, pp. 278-282.

When designing and installing a fume venting layout, in addition to the correct choice of material for acid protection, attention must also be given to the air flow. Satisfactory collection and good exhaustion of the gases and vapors at the point of origin are fundamentally dependent on the exhausting fan, the suction hood and the piping.

The suction effect is actuated by the fan and the correct type and dimensioning of the fan is most important for efficient operation. With large bath surface areas, edge suction usually is not sufficient. In such cases, in addition to suction, there is used an air trap. To achieve this, on one side of the tank air is blown in a wide front over the tank surface and this current of air and conducted fumes are sucked away at the opposite side of the tank. The volume of air required to achieve this effect is dependent on the bath surface, on the temperature and on the movement of the bath liquid.

For a bath surface of 1 sq. m. the venting air must amount to 30 to 45 c.m./min. The venting pipeline should be so dimensioned that the air velocity always remains the same. Sharp bends are to be avoided in the venting pipe. Branching unions in the pipeline should be made at an angle of no more than 15°. In many cases, blowing of the vented gases into the open air cannot be allowed to take place. In the case

of acid fumes, an acid separator or a washing tower is installed in the pipeline, before the cleaned air is vented to the open. In extreme cases, the pipelines can be constructed wholly of acid-resistant materials and suitable materials are stainless steel sheet, hard lead, aluminum, chemical stoneware, and plastic, depending on the working conditions. In recent years polyvinyl chloride is being used to an increasing extent for this purpose. With this material however, the gases and vapors should not exceed a temperature of 40° to 50°C. as above this the material softens. Workrooms in which the air is vented away by such suction layouts, must be heated in winter, and air heating is the best method to apply here.

#### Drum Pickling Layouts for Sheet Strip Metal

Maschinenmarkt. Vol. 61, No. 26, p. 7 (1955).

A coil of strip metal is placed in the pickling drum, and this is then placed in the pickling tank. The pickling drum is then revolved for such a time until the external diameter of the coil corresponds to the internal diameter of the pickling drum. The direction of rotation is then changed. so that the coil is again rolled up. This procedure is conducted several times and gives a sound and rapid pickling. Metal strip widths of 50 to 2,000 mm. can be treated in this way. The floor space required by a pickling unit of this type is a fraction of that required by an orthodox continuous pickling line. This type of strip pickling unit is particularly suitable for the smaller, average sized works and those which have a highly fluctuating volume of production.

#### Adhesion of Chromium Coatings with Alternating Loading

Starosselski and D. N. Garkunow: Machine Design News (Russia). Vol. 32, No. 6, pp. 55-56.

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With alternating stressing, the adhesion of a chromium coating depends on the strength of the steel base metal: it increases with increase of the coating thickness. With higher strength of the base metal, the chromium coating holds longer than with a less strong steel.



Germanium has no peer for use as a semiconductor in providing an efficient source of DC current. However, germanium is extremely heat sensitive and management be protected against thermal overload and current faults which, if unchecked, would instantly destroy the germanium junctions.

After two years of research and design in collaboration with the General Electric Company, Wagner Brothers is proud to announce their new, completely protected, highly efficient Germanium Power Rectifier.

General Electric "Safety Cells" are hermetically sealed to shield the germanium element from moisture and any corrosive fumes. Each "Safety Cell" is individually protected from destructive current faults by fast-acting "amp trap" fuses which break the circuit in a fraction of a second, before the germanium junctions can be destroyed.

Further protection from normal overcurrent and undervoltage input is provided by separate breakers on the main contactor and on the blower motor. A pressure switch guards against thermal overloads in case of blower malfunction.

Now you can have the advantages of efficient germanium power rectification—plus, assurance that current faults and overheating will not cause stack burnout, downtime and expensive repairs.

If you need a dependable source of DC current, write for our portfolio of technical information.



CHICAGO

CLEVELAND

NEW YORK

Wagner

BROTHERS

## Recent Developments

NEW METHODS, MATERIALS AND EQUIPMENT FOR THE METAL FINISHING INDUSTRIES



#### **Brass Brightener**

Jelco Finishing Equipment Corp., Dept. MF, 153 E. 26th St., New York, N. Y.

New, improved Jelco brass additive is claimed to offer the following advantages when added to a brass plating solution:

- 1. Brighter plate
- 2. Faster plate
- 3. Uniform color control
- 4. Use of higher current densities
- 5. Great decrease in anode polariza-
- 6. Elimination of cyanide fumes
- 7. Deposition of a soft buffing plate
- 3. Increase in throwing power . . . plus many other advantages.

The brass additive can be used in the standard ammonia type of solution or in the new high speed caustic formulations. The additive is used for both still and barrel plating solutions.

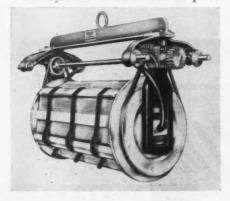
The additive is stated to have been completely tested and proven under job shop and manufacturing plant conditions and is now being used effectively on products such as lamps, hardware, furniture parts, zippers, and oxidized and antique finishes.

#### **Plating Barrel**

George A. Stutz Mfg. Co., Dept. MF, 4450 W. Carroll Ave., Chicago 24, Ill.

A new belt drive, complete cycle, plating barrel with no cylinder gears or bearings is claimed to have a low initial cost and the lowest possible maintenance cost.

The cylinder is made of one piece



Plexiglas construction, suspended and rotated by two V-belts and arranged between cast iron guide frames. For smooth barrel operation, saddle horns are located on 15" centers. Cathode contactors are dangler type.

The units are made to fit all makes of plating tanks. Standard sizes are  $14'' \times 30''$  and  $14'' \times 36''$  (I.D.), with 12 additional sizes from  $12'' \times 24''$  to  $18'' \times 42''$  (I.D.). Standard perforations  $\frac{3}{3}2''$  round on  $\frac{3}{16}i''$  centers. Patented dual hole for processing of extremely small parts is available.

#### **Chromate Conversion Coatings**

Conversion Chemical Corp., Dept. MF, Rockville, Conn.

A new group of protective films, the Kenvert chrome sealer type films is designed to provide maximum protection for such common non-ferrous metals as copper, zinc, brass, cadmium, and aluminum against tarnish, stains, finger prints, and for inside corrosion protection.

The efficiency of the new sealers in increasing the adhesion of organic films, lies in their ability to prevent the formation of metallic soaps; one of the common causes of failure of organic films on these metals. They are particularly recommended where paint or lacquer films have been giving premature failure in the presence of moisture; and are claimed to be superior in almost every application to either oxide or phosphate type films.

Many of the finishes brighten as well as protect. All finishes are produced in simple, short, dipping operations; requiring no expensive equipment, racking, exhausting, or heating facilities.

A finish of particular interest in this season of the year is No. 32, claimed to virtually eliminate the tendency for "spotting-out" on brass plate; as well as preventing staining and finger printing prior to lacquering. In many instances the extra lacquer mileage obtained, more than saves the treating cost involved if no other factors are taken into consideration.

#### **Drum Upender**

Morse Mfg. Co., Dept. MF, 727 Manlius St., East Syracuse 2, N. Y.



Less muscle is needed to upend loaded oil or chemical drums using the newly developed drum upender No. 32. The new drum upender has a  $40^{\prime\prime}$  handle, offset  $35^{\circ}$  for maximum efficiency in raising drums from horizontal to vertical. A hefty  $1^{1}\!/_{4}^{\prime\prime}$  hook provides adequate clearance for the largest chime. A  $2^{1}\!/_{2}$  x  $8^{\prime\prime}$  toe plate spreads lifting pressure over a large area to prevent drum damage.

This new tool, engineered for manually upending heavy drums with a minimum of effort speeds production, makes drum handling a fast, one-man operation. It cuts lost manhours due to personal injuries while handling heavy drums. Strong and durable, the tool is designed to give long, economical service.

#### Pickling Additive

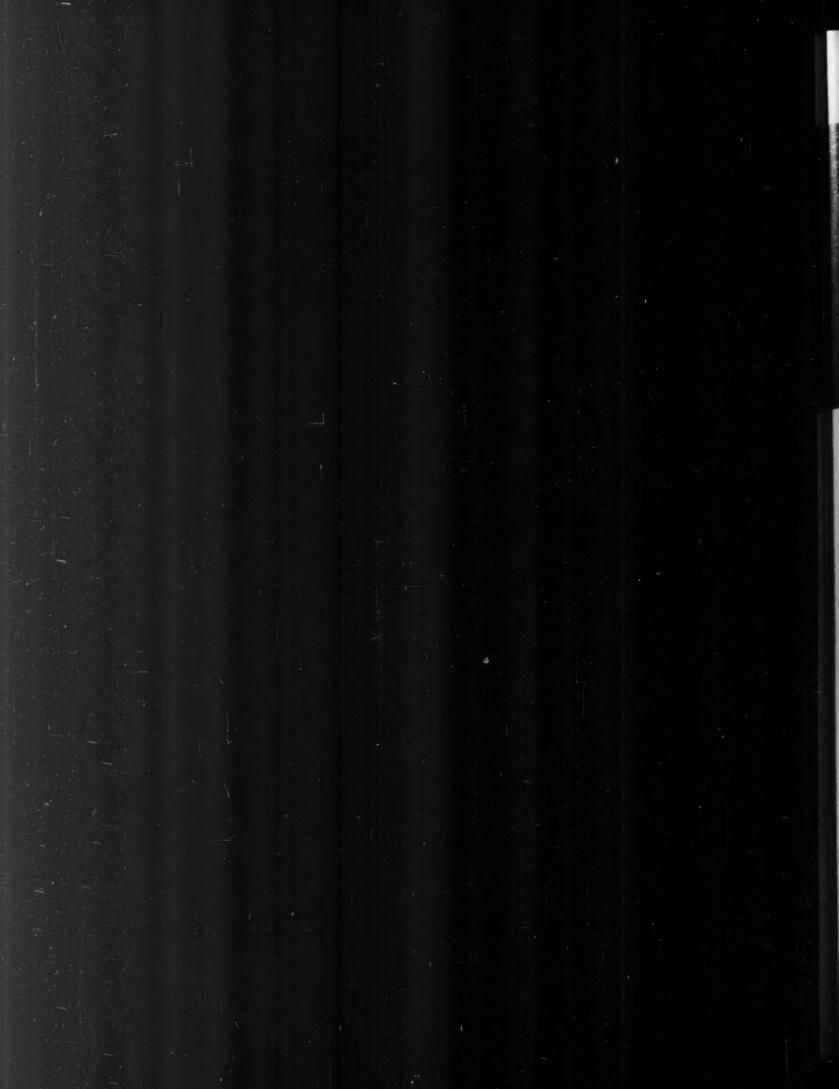
Harry Miller Corp., Dept. MF, 4th and Bristol Sts., Philadelphia 40, Pa.

Activol No. 1357 is an odorless, non-flammable, green liquid that dissolves instantly in all acids to make a clear solution with exceptional detergent ability in batch, continuous or spray pickling. Baths containing the material insure instant acid-to-metal contact, last as much as 50% longer and afford improved drainage and better rinsing. Fume formation and odors arising from pickling solutions are said to be reduced when the product is used, a feature that is pleasing to operators, and its high detergency

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# Aluming and cleaning anodizing, buffing and cleaning

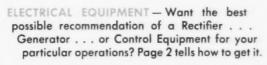
No matter what your aluminum finishing

problem or need, you'll find the answer at H-VW-M...

because it is the one company

combining a complete engineering service

with a complete line of equipment and supplies!



STILL TANK OR FULL AUTOMATIC EQUIP-

MENT — Whatever your need — from a single component to a complete, integrated system—H-VW-M supplies it . . . Page 3.

ENGINEERING SERVICE AND INSTALLA-TION -H-VW-M engineers and technicians are

TION—H-VW-M engineers and technicians are anodizing equipment specialists, with years of experience. Page 3 tells why these H-VW-M services mean greater efficiency and savings in your plant.

shows how H-VW-M research has resulted in new compounds, improved buffs and cleaners to make aluminum finishing easier, better.



## HANSON-VAN WINKLE-MUNNING COMPANY MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and politicing processes, equipment and supplies

Plants: Matawan, New Jersey \* Grand Rapids, Michigan

Sales Offices: Anderson (Ind.) • Baltimore • Beloit (Wisc.) • Boston • Bridgeport • Chicago Cleveland • Dayton • Detroit • Grand Rapids • Los Angeles • Louisville • Matawan Milwaukee • New York • Philadelphia • Pittsburgh • Plainfield (N. J.) • Rochester • St. Louis San Francisce • Springfield (Mass.) • Utica • Wallingford (Conn.)

## These H-VW-M Anodizing and Finishing to New Savings, New Efficiency, New

#### ELECTRICAL EQUIPMENT

H-VW-M is the only manufacturer of both Germanium and Selenium Rectifiers and low voltage, direct current Motor Generator Sets for the metal finishing industry. This thorough experience in every phase of low voltage power generation and rectification means that when you bring your power problems to H-VW-M you're sure to get the perfect equipment recommendation.

#### Generators . . . and Controls

H-VW-M Motor Generators designed especially for metal finishing operations are built in sizes up to 50,000 amperes, and accessory equipment includes a full line of controls and control panels to cover any desired control function. Easy-to-maintain H-VW-M Motor Generators have exceptionally rugged and practical construction features insuring maximum performance and life. Standard voltage ratings range from 6 to 50 volts, and include the 18 and 24 volt units usually re-





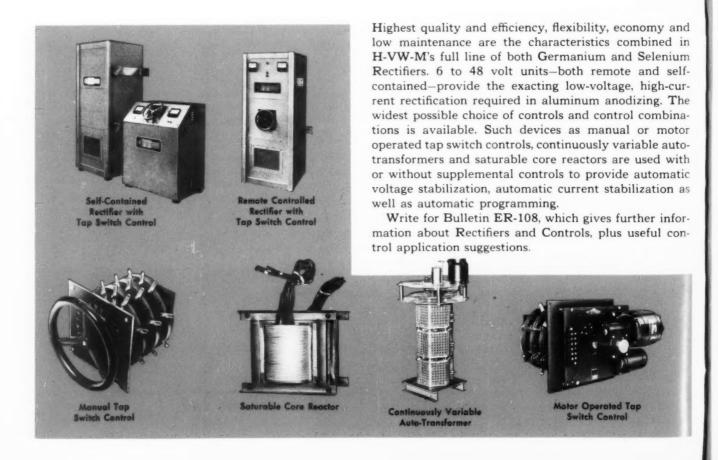
Automatic Anodizing Control Panel

ald

15,000 Ampere, 6-Volt Generator Unit

quired for sulphuric acid anodizing, plus the 40 and 50 volt units used in chromic acid anodizing. Write today for 24-page Bulletin G-103, covering in detail all H-VW-M Generators.

#### Germanium and Selenium Rectifiers . . . Rectifier Controls



## Supplies, Equipment and Services Add Up Simplicity of Operation in Your Plant

#### PROCESSING EQUIPMENT

Whatever your anodizing procedure, there's an H-VW-M Full Automatic Conveyor that can be adapted to any production application requiring automatic cycling of individual treatments—or an H-VW-M Tank with accessory equipment that is perfectly adapted to still tank methods of any kind.



With H-VW-M automatic anodizing system, 1 man in furniture company does work of 12.

Full Automatic Conveyors

H-VW-M was the pioneer in the development of full automatic conveyors for use in electroplating and other electrolytic processes. Over the years H-VW-M's close association with production problems in plating rooms across the nation has resulted in scores of innovations and improvements which have contributed substantially to the steady advance of metal finishing techniques.

Full automatic conveyors as used in anodizing operations have been an important concern at H-VW-M for years. One special development of particular interest in aluminum anodizing is H-VW-M's unique selective by-pass mechanism. With this device a whole rainbow of colors can be anodized in one continuous operation, and in any sequence. Length of treatment time can be varied for each individual conveyor arm, consistent with the overall cycle. These features bring a new kind of versatility to anodizing operations. Different products

requiring different anodizing cycles may be processed at the same time, using the same equipment. In terms of efficiency, labor savings and increased production, this unusual device is truly revolutionary.



Workman "dials" desired cycle in refrigerator plant. Parts will by-pass or lower into baths as dial setting dictates.



Featured in anodizing system for massive building panels are special 30-ft. tanks. Entire system H-VW-M designed, installed.

It is just one among many types of conveyors and equipment offered to aluminum finishers. Return-type conveyors . . . elevator conveyors . . . high-lift conveyors . . . straight-line conveyors . . . and others, all are designed, manufactured and installed by H-VW-M. Write for Bulletin FA-105, which fully describes all types.

#### Tanks and Equipment

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At H-VW-M – the plating and anodizing industry's workshop—you'll find tank equipment for every phase of your work. For chromic acid anodizing, H-VW-M double electric welded unlined steel tanks are offered, along with steel coil equipment for cooling and heating. The entire system is H-VW-M designed, supplied and installed. For sulphuric acid anodizing, lead-lined steel tanks, plus the necessary cooling coils and air agitation

assembly, are supplied. Tanks are fabricated from hot rolled steel, stainless steel, and aluminum. Other types of tanks are also available. Bulletin No. T-108 gives full particulars about this important H-VW-M equipment. Every conceivable type of auxiliary equipment is engineered and supplied, according to customers specifications, including a complete packaged refrigeration system for anodizing solutions.

#### And H-VW-M's Engineering and Installation Service

Anodizing problems of any kind? H-VW-M is prepared to set up your entire anodizing system from beginning to end—a system made up of components scientifically engineered to work together with utmost efficiency. Because of this, and because of H-VW-M's continuing research and development in every aspect of the anodizing picture, you can be confident that the recommendation you receive from H-VW-M is the very best.

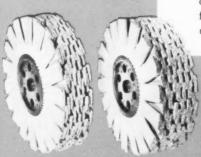
What's more, if requested, H-VW-M sees to it

that the equipment you buy is H-VW-M installed. This means perfect, efficient operation from the start.

Add to this the fact that an H-VW-M technical representative—ready to serve you—is no further than your telephone. These representatives serve in principal cities across the nation. Get to know the one nearest you. He can help you get the most from your aluminum finishing equipment and supplies.

#### ALUMINUM BUFFING AND CLEANING SUPPLIES

Since aluminum came into its own after World War II, considerable H-VW-M research and development work has been devoted to the perfection of buffs and compounds suiting the unique physical characteristics of this popular light metal. When long-wearing H-VW-M Buffs are used in conjunction with H-VW-M compounds especially formulated for aluminum finishing, you have the perfectly balanced combination for economy, efficiency and quality performance.



#### Buffs

Nowhere will you find a wider selection of the buffs you need for preanodizing operations than at H-VW-M.

Whether you're looking for a super-heavy-duty buff like new steel-centered Ruff-L-Buffs (which are available untreated, or Binderized® for extra long wear) medium duty buffs like Triplex Buffs, or a buff for medium-tolight service such as the Full Disc Buff, you need look no further than H-VW-M. The full H-VW-M line also includes new Tufta-Flex Buffs (cloth tufts) and Sisal-Flex Buffs (with sisal-centered tufts), plus specialty buffs of every variety.

Among this array you'll find the exact buffs for your aluminum finishing needs. Every one is characterized by first quality, uniform new material of close weave and good weight . . . tight sewing with heavy thread . . . and proper balance. Write for 12 page Bulletin B-103, which describes H-VW-M's entire buff line.

#### Compounds

For heavy duty cutting, H-VW-M Liquid Tripoli Compounds 303 and 420 were developed, and are now widely used in the cooking utensil industry. For the appliance, storm

window, construction materials and automotive fields, H-VW-M's new Liquimatic Liquid Compound No. 728 has proved especially successful, giving excellent cut, while leaving the surface with deep, high color.

H-VW-M Bar Compounds also find broad use in aluminum finishing. A variety of tripoli bar compounds





Liquim atic System

are offered in varying consistencies to meet all cutting requirements. For cut and color, special white compounds are available. And for high color, several new H-VW-M aluminum oxide compounds-No.'s 6B 168, 6B 72 and 8390-give unusually good results. Write for Bulletin CO-103.

#### Cleaners

H-VW-M devotes constant research to the subject of cleaners in its search for ever better products in the aluminum finishing field.

Matawan Cleaners are designed specifically to give superior results in soak cleaning, power spray operations, oxide removal, and for special aluminum cleaning and etching operations. Of particular interest is H-VW-M's 85S Cleaner, which prevents scale formation, thus keeping coil and tank walls scale free. This unusual aluminum cleaner leaves an extremely bright surface, and, because of its built-in regenerator, makes maximum effective use of caustic in the bath.

In line with its desire to supply the exact cleaner for the job, H-VW-M offers its extensive laboratory facilities where circumstances demand a special cleaner.

When you think of aluminum finishing equipment and supplies-think of H-VW-M first. Buying from one dependable source . . . H-VW-M ... means one company assumes full

responsibility-your guarantee that you're getting the best . . . in products . . . in perform-

ance, in extra service.



Your H-VW-M combination Your H-VW-M combination of the most modern testing and development laboratory — of over 80 years experience in every phase of plating and polishing — of a complete equipment, process and supply line for every need. HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, N. J. Plants: Matawan, N. J. . Grand Rapids, Mich

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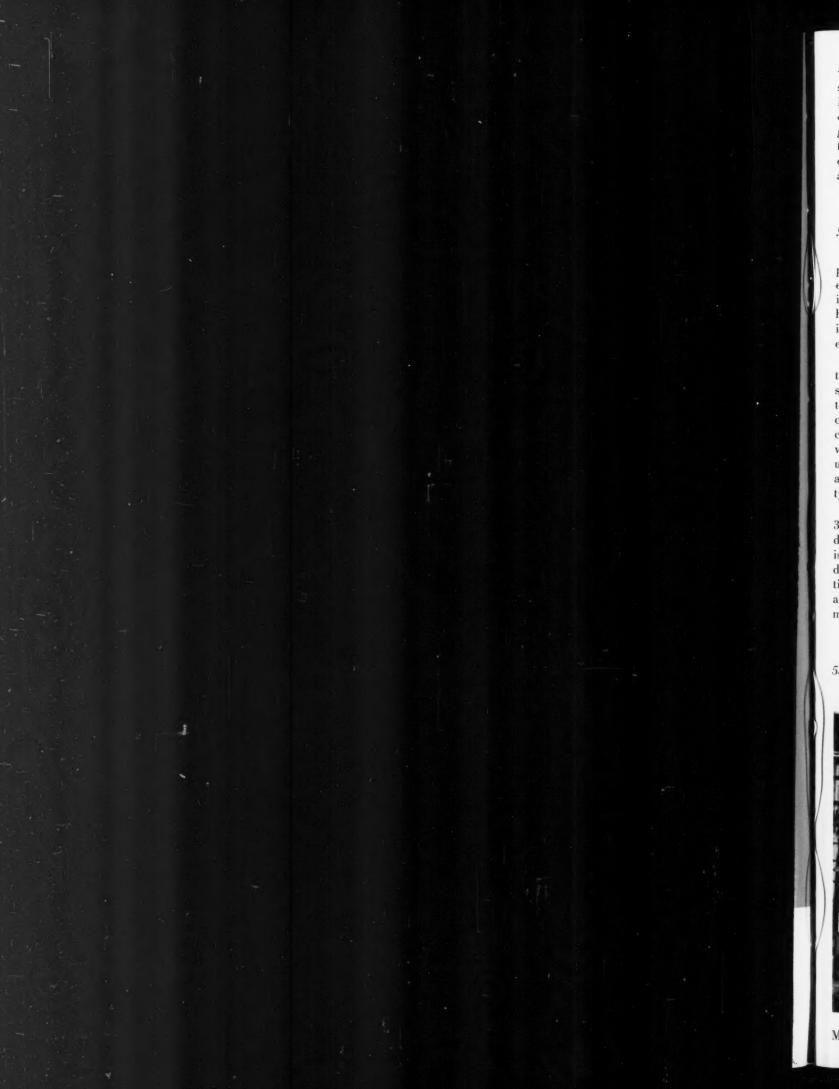
Utica • Wallingford (Conn.)



INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES . EQUIPMENT

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value insures a clean surface for subsequent treatment after pickling. The inhibiting properties prevent pitting or over-pickling and it eliminates hydrogen embrittlement of metal. In addition, it saves acid, particularly where expensive hydrofluoric acid is used, and it will not wear out or evaporate.

#### **Utility Barrel Plater**

Lasalco, Inc., Dept. MF, 2818 La-Salle St., St. Louis 10, Mo.

A new, clear plastic utility barrel plater is designed for faster, more economical plating of small lots. Designated as Model 9X15, it can be hung on the cathode rod in any plating tank and plugged into nearest electric outlet.

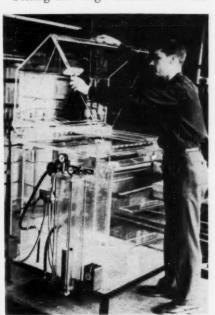
The hexagon-shaped, high temperature Plexiglas 9" x 15" cylinder resists all normal plating solutions and temperatures up to 180°F. Tree-up on cylinder is entirely eliminated, it is claimed. Internal breaker strips provide interchange of work for more uniform plating. Cylinder has removable door with plastic-coated, springtype latches.

Positive, smooth running Plexiglas 3-gear drive eliminates plate-up on drive mechanism. Barrel rotates as it is lifted from the solution reducing dragout loss. Double flexible connection gives positive contact. A specially-designed, heavy duty geared-type motor is standard.

#### **Corrosion Test Cabinet**

The G. S. Equipment Co., Dept. MF, 5317 St. Clair Ave., Cleveland 3, O.

Setting new high standards of uni-





Our best "door-opener" and "contract-closer" is the product itself. On its merits it has built us a "blue chip" customer list.

Why not see for yourself how good BFC Chromic Acid really is by sending us an order to cover your next spot need?

#### BETTER FINISHES & COATINGS, INC.

268 Doremus Ave., Newark 5, N. J. • 2014 East 15th St., Los Angeles 21, Calif.

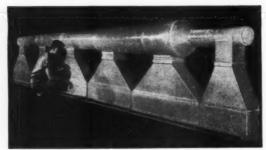
form accuracy and versatility is the latest "approved" Singleton "H-T Sincolite" (transparent) Test Cabinet. Recent refinements in the cabinet design earned "official approval" as meeting A.S.T.M. and U.S. Government Specifications for such equipment, according to the above manufacturer. The redesigned, transparent water jackets which house the 2 electric heaters, front and back, are extended to full width of cabinet. Added area covered by the new water jackets maintain temperatures throughout cabinet to a fine degree of uniformity heretofore unattainable. Test specifications allow tolerance of -3°, + 2°F. The cabinet holds to  $\pm \frac{1}{2}$ °F., the closest tolerance yet achieved in this type of equipment. Danger of "hot

bottom" is eliminated which would ordinarily cause vaporizing of contaminated condensate on the cabinet floor.

Extra insulating effect prevents excessive fogging or condensate on transparent walls, permitting clear visability into entire cabinet. Progress of tests can be observed, front and back, through these water-jacket "picture windows" without opening lid, interrupting the process or handling specimens. This offers a special advantage in short tests of black oxide finishes and other less-protective coatings.

According to the manufacturer, these and other accuracy-factors are enabling users to claim "all test results within 10% of absolute duplication." For operating convenience, all

### ENGINEERED STANDARD EQUIPMENT FOR YOUR COMPLETE VENTILATION REQUIREMENTS



Rigidon Solid Plastic Hood and Duct Section Ready to Install

#### **EXHAUST HOODS • DUCTS • STACKS • COVERS**

Fabricated of solid plastic or lined steel. Standard designs available.



Rubber Covered Blower

#### **EXHAUST FANS . . . .**

Solid Plastic Fans or Lined or Coated Blowers Handle the Toughest Corrosive Atmospheres.

#### FUME WASHERS . . . .

New Improved Design. Standard Model Sizes, available in Steel, Lined Steel or Plastic Fabrication for Any Service.

#### AIR SAVER SYSTEMS . . . .

Pre-Engineered, Push-Pull Exhaust — Minimizes makeup air requirements. Fabricated of steel or solid plastic construction.

COMPLETE ENGINEERING SERVICE AVAILABLE TO ASSURE PROPER ECONOMIC DESIGN TO ALL COMPONENTS OF YOUR VENTILATING SYSTEM REQUIREMENTS.



controls are now located at the left

The cabinet is transparent, non-porous, inert to test solutions-preventing secondary galvanic acceleration of corrosion. Fusion-welded construction provides permanent, no-leak seams. Complete absence of deterioration and maintenance extends service life for vears. No corrosion-susceptible materials, used in its construction, are exposed to test solutions or vapors. All gauges and metal parts are on the outside.

#### Small Parts Washer

Magnus Chemical Co., Inc., Equipment Div., Dept. MF, Garwood, N. J.



The "Roll-O-Matic Laundry" automatically washes, rinses, rust-protects and dries small metal parts such as acorn nuts, screw machine parts, fittings, etc. It not only removes oils and other industrial soils. but troublesome loose chips as well thus eliminating hand scrubbing and air blow-off, according to the above manufacturer.

The dirty parts to be treated are loaded in a revolving drum, attached to an air cylinder. The drum is lowered into the unit's tank and the parts are rotated in the wash solution for a pre-determined period, followed by a spray rinse then a rotating anti-rust treatment and finally a hot air dry. Washing and anti-rusting solutions are salvaged for reuse.

After completion of the final liquid or dry stage the drum is automatically raised. The unloading chute, which is attached to the drum, then lowers. The operator opens the door on the drum and parts are dumped on the chute and slide to a tote box or pan.

The machine can be fabricated to accomplish as many chemical or liquid stages as required. It is a compact unit requiring a minimum of floor space, and does not require a special pit or foundation.

#### Cloth and Sisal Buffs

Hanson-Van Winkle-Munning Co., Dept. MF, Matawan, N. J.

Fast, thorough cutting and coloring of intricate contoured metal surfaces is provided by a new line of cloth and sisal buffs. According to the above manufacturer, the buffs will cut and color metal in a single operation, due to their design and materials of construction,

Both types of buffs utilize doublefolded tufts to provide maximum cutting surfaces and retain compound at leading edges and on the buff circumference. Tufts are staggered in a double row around the buff to prevent streaking. This also makes the buff self-ventilating, insuring cool opera-

All cloth and sisal used in these buffs is cut on the bias, to insure greater strength and long life. This also eliminates the problem of loose ends which can scratch, cut or gouge the surface of the metal.

A steel center, composed of two steel discs, provides strong support for each buff. Steel clamps around the circumference of discs hold the buff in place. Added strength is assured by heavy-duty stitching around the buff's inner circumference. The steel discs are multiple spot welded together. Six ventilating holes assure free circulation of air from the center of the buff to its periphery.

Sisal-Flex buffs are made of top-

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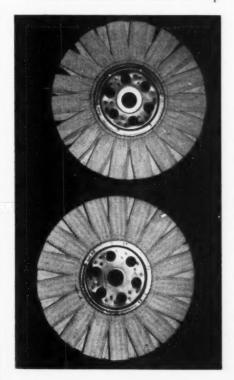
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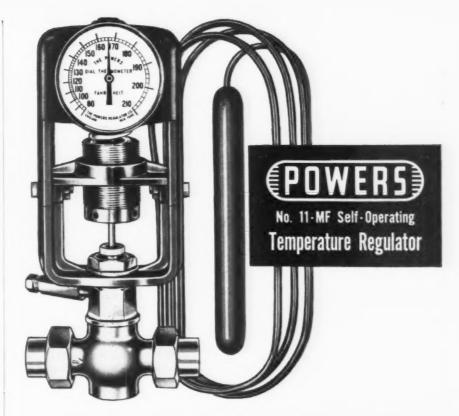
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## Simplest Way to Control Temperatures Accurately in Plating, **Cleaning and Rinse Tanks**

Lowers Costs — Betters Quality Control — Repays Its Cost 3 to 6 Times a Year. You eliminate "the human element" in temperature control with Powers Automatic Regulators. Simple, compact and dependable, they stop OVER-heating. Thus, automatically, you save on burnt plated parts, rejected anodizing, decomposition of costly additives, and loss of volatile ingredients from some cleaning solutions. You save, too, by preventing "boil-overs." No waste of steam and water by evaporation.

Why Powers No. 11-MF Regulator Gives Better Control and Lasts Longer. Better TEMPERATURE control results from powerful bellows and minimum valve stem friction. Valve Stem Lubricator aids easy move-

ment of valve stem without binding. Double ply metal used in Powers bellows outlasts single ply type. Greater durability of plastic covered bulb and tubing also helps prolong the life of the regulator.

Easy to Install - No Insulators Required. Installation of the Powers No. 11-MF goes quickly with no troublesome insulation problems. The unit is completely self-insulated.

Large Dial Thermometer Gives Visual Check. Instant visual temperature

check of solutions under control is obtained from the large dial thermometer, makes it easy to adjust regulator for different temperatures.

Powers Nationwide Service and 24 Hour Delivery in the U.S.A. are important time and money saving advantages. Order a Powers No. 11-MF Regulator now. Call your supply firm or write us direct for Bulletin 330 and prices.

(c50)



#### THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS Offices in chief cities in U.S.A., Canada and Mexico

Over 60 years of Automatic Temperature and Humidity Control



grade sisal cloth covered with bias cut cotton cloth. Four rows of stitching on each tuft, plus the double-fold construction, keep the cloth from fraying and increase buff life. The sturdy construction and material used in these buffs make them particularly suitable for hard and heavy cutting of steel and stainless.

Tufta-Flex buffs are made of 86-93 bias cut cotton, with each tuft stitched twice to assure greater flexibility of the buff. It produces a smooth metal finish and can be used on any medium to heavy metal-finishing job. These buffs can be used for fast cutting-coloring jobs that do not require a buff as rugged as the Sisal-Flex.

Both buffs are available in diameters ranging from 12" to 18".

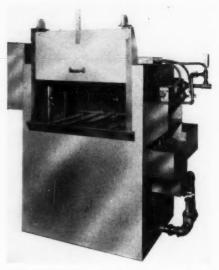
#### Cabinet Type Cleaning Machine

Ransohoff, Inc., Dept. MF, 1001 Ford Blvd., Hamilton, O.

Developed for cleaning small parts, this new automatic machine is widely adaptable for washing, rinsing, and drying in all metalworking fields.

The machine occupies only 10 square feet, and can process up to 40 baskets of parts per hour. Savings in labor are possible since one man can operate a single machine in conjunction with another job or a group of machines as one job replacing a crew of men.

The completely automatic "Ransomatic" Small Parts washer cleans two baskets or other loads of parts in one load. Maximum overall size of each



basket is  $21\frac{1}{2}$ " long.  $14\frac{3}{4}$ " wide and 14" high. The baskets are loaded into the cabinet and the door is closed. This starts an automatic. adjustable time cleaning cycle in the following sequence: hot recirculated cleaning solution spray for 30 seconds; hot water rinse spray for 60 seconds and a draindry for 90 seconds. The machine is designed so that wash, rinse and draindry periods are widely variable to suit the work. In the rinse operation, the parts accumulate enough latent heat to air-dry themselves after the excess water drains off. A hot air drier can be added to the machine when required.

At the completion of the cleaning cycle, the door opens automatically and the baskets or racks of parts are unloaded by the operator. The door remains closed while the automatic washing and rinsing cycle is in progress, assuring thorough cleaning and providing operator safety.

The design of the machine is such that an extremely efficient spray action is obtained. "Walking" sprays cover the parts from all angles and do a most effective cleaning job on the "difficult" parts. Chips and foreign materials are removed from the recirculated washing solution and rinse water by means of a strongly built chip basket.

Stainless or mild steel construction, as required, is rugged thereby assuring trouble-free and economical operation. The solution tank forms the base for the cleaning cabinet and contains plate coils for efficient, economical heating of the wash solution and easy removal for tank cleaning. An instantaneous steam coil type heater is provided to heat the rinse water. Auto-

matic controls maintain temperatures of the solution and rinse water. Heating of wash solution and rinse water can be done by gas, oil or electricity as required.

#### **Industrial Gloves**

Hood Rubber Co. Div., B. F. Goodrich, Dept. MF, Watertown, Mass.

A new industrial glove made of an exclusive non-absorbing butyl rubber compound has been designed to protect the hands from the most destructive acids.

The glove is a one-fingered model with seam and crotch reinforced. It is light green in color and has a rough, stippled finish.

It is claimed to resist the most destructive agents such as sulphuric. pitric and phosphoric acids, oxygen, ozone, oils and salts.

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#### **Alkaline Rust and Paint Remover**

Turco Products, Inc., Dept. MF, 6135 South Central Ave., Los Angeles 1. Cal.

A new alkaline material is claimed to be suitable for the removal of rust, paint and primer in one easy dip and rinse operation. Called Alkaline Rust Remover, the powdered compound is said to eliminate four of the six steps required for rust and paint removal by conventional methods.

The product removes light rust in less than a minute. Heavy rust and multiple paint layers usually require only a few minutes immersion. Even such stubborn paint deposits as red oxide primer, baked lacquer, acidproof paint and asphalt finishes quickly yield to the rust remover.

The material contains no cyanide compounds. It neither requires complicated electrolytic equipment nor emits corrosive fumes. Hazards commonly encountered when charging

This man is helping cut small parts drying time just about one-half... Model 20 New Holland KREIDER Centrifugal Dryer AIR-DRIES ... as it SPIN-DRIES! Now you can spin-dry small parts in continuous fresh air in as little

as 15 seconds . . . cut drying time just about one-half.

Double-action drying gives you smooth moisture-free surfaces . . . reduces your finishing problems by eliminating the scarring and marring frequently responsible for costly "rejects."

Speed production . . . cut costs way down with New Holland's easy-to-run Model 20 Kreider Centrifugal Drver.

Choose from 3 models engineered to meet your requirements: - Standard Model; Standard Model with Supplementary Electric Heat; Standard Model with Supplementary Steam Heat.

#### - SPECIFICATIONS: -

1 h.p. motor-220, 440, 550 volts—2- or 3-phase—spins 75 lb. loads at 825 r.p.m. . . Quiet V-belt drive . . . 30-blade suction turbine draws air through spinner . . . Arc-welded steel-plate onstruction . Heavy-gauge woven

steel mesh basket . . . Weight: 490 lbs. . . . Floor space: Just under 5 sq. ft. . . . Meets N.F.C. Specs. Optional: J.I.C. Con-trol: Mounted on right, left side or wall. 160° supplementary heat: 2350-watt Chromalox, or steam.

Send for illustrated 4-page folder. Address Dept. M-66 New Holland Machine Company New Holland, Pa.



#### New Holland Machine Company

pressure rinse.

acid tanks are eliminated. It will not affect dimensional tolerances or cause hydrogen embrittlement. And, it requires no after neutralization, just a

Metals de-rusted with acids will normally re-rust in a matter of hours unless they are further processed or coated with a rust preventive. Metals de-rusted with the alkaline rust remover, however, are no more subject to rusting than is new metal.

#### Abrasive Cloth Wheels

Minnesota Mining and Mfg., Co., Dept. MF, 900 Fauquier St., St. Paul, 6. Minn.

A new line of small "PG" wheels, designed for polishing metal with portable hand tools, have the same basic design as the company's large polishing and grinding wheels introduced last fall, composed of die-cut pieces of coated abrasive cloth, bonded



Steel part shown above has been partially de-rusted with Turco Alkaline Rust Remover. Note that rust has been completely stripped off portion to the left, while right side of part is totally encrusted with heavy rust.



Roto-Finish maintains exact tolerances on precision parts with no significant dimensional changes. It makes possible a wide range of finishes applicable to parts of almost any size or shape; finishes a variety of materials — at big savings in manpower and costs. Without obligation, send sample unfinished parts to us. Include finished part for guide and your specifications. Roto-Finish will finish parts in its laboratory. You get a complete process report. You are guaranteed results and a finish that counts!

WRITE FOR FACT-PACKED ROTO-FINISH CATALOG NOW



3706 Milham Road, Kalamazoo, Michigan

Originators of the Roto-Finish Process



Phone 3-5578

with resin and locked into a hub. Small wheels are especially suited for polishing soft metals such as lead and solder because the coated abrasive

cannot become filled. The mineral grains and the backing wear away together, presenting an always-new



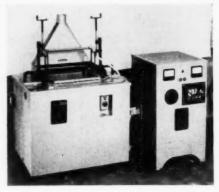
surface to the work. This action assures a constant polishing pattern, since mineral grains never become dull: and the rate of cut is constant through the life of the wheel.

The new coated abrasive wheels are designed for use on portable grinders, flexible shaft equipment or small bench-type grinders. They are available in 6" to 10" diameters,, with 1", 11/2", 2" and 3" face widths, and in an 11" diameter in 2", 21/2" and 3" face widths. The wheels are currently being made with aluminum oxide or silicon carbide mineral on a cloth backing, in grits ranging from 50 through 320.

The wheels are being sold nationally through industrial distributors and 3M branch warehouses.

#### **Chromium Plating Unit**

Dawson Corp., Dept. MF, 302 Fifth Ave., No. Pelham, N. Y.



A new, large capacity chromium plating unit is especially designed to plate large size metal forming and plastic molding dies as well as engraving plates, heavy shafts, etc.

Known as the Chromplater Model 300 this unit has a plating tank 15" x 20" x 30" deep. It is equipped with two 3,000 watt electric immersion heaters and a heavy gauge steel water jacket which provide accurate control of the plating bath through an adjustable thermostatic temperature control. A special feature is the plastisol covered steel work platform with bus bar supports and acme thread height adjustment for maximum plating efficiency.

The fully equipped rectifier, which provides a 300 amp. D.C. output to the plating bath, operates on a standard 200 V 3-phase 60 cycle AC service connection.

Both units are finished in blue hammertone on rugged sheet steel, the plating unit being 38" x 28" x 33" high and the rectifier 22" x 40" overall.

#### Thickness and Adhesion Tester

Brush Electronics Co., Dept. MF, 3405 Perkins Ave., Cleveland 14, O.

A new portable electronic instrument can be used to check stock, parts in process or finished products for many characterteristics other than chemical composition, such as hardness, heat treatment, metallurgical structure, uniformity, plating thickness and plating adhesion. The Metal Monitor is sensitive to differences between two pieces of steel as little as 1 point of carbon.

Operation of the device is based on a principle of the thermocouple effect: the junction of two dissimilar metals

produces an electromotive force. In operation, an electrode (with a selfheating element) is placed in contact with the metal to be tested. The voltage



generated by this contact is amplified and transmitted to a meter on the device. The reading is then compared to readings obtained from samples whose compositions and metallurgical characteristics are known.

The device is easy to operate and requires no special or technical education on the part of the operator. It is portable (21 pounds) and can be moved to the job.

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Since the instrument is non-destructive, it can be used on finished parts and assemblies and only a very small area of contact is required on the piece being tested. As many as 3,000 pieces per hour can be checked.

#### **Economy Hand Pump**

Bowser, Inc., Dept. MF, 1300 East Creighton Ave., Fort Wayne, Ind.

A new piston-type, positive-displacement, self-priming hand pump now in production delivers 20 g.p.m.

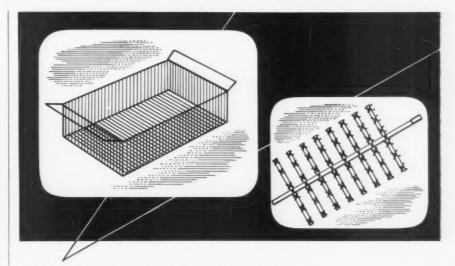
Features claimed include stainless steel replaceable liner, stainless steel shaft, aluminum body and piston, corrosion-resistant valves and molded plastic bearing, and built-in strainer. Fast disassembly permits easy cleaning or reversing of flow direction according to the above manufacturer.

Available as pump only, barrel pump, pedestal pump or with hose and nozzle delivery, the all-corrosion-resistant moving parts are said to make the pump suitable for handling many industrial solvents.

#### Four-Head Conveyor-Type Belt Grinder

Engelberg Huller Co., Dept. MF, 831 W. Fayette St., Syracuse 4, N. Y.

This new contact-wheel abrasive belt



# METAL SURFACES LAST LONGER with a COATING OF STANLEY CUSTOM PLASTISOL

Plating racks, appliances, and most metal surfaces that need protection are safer under one of Stanley's complete line of plastisols. High resistance to chemicals, corrosion, and hard use plus a tough, attractive surface that looks like baked enamel but lasts longer are two reasons why Stanley Plastisols over Stanley Primers are turning up on more metal products every day. Write for more information and ask about Stanley Stop-Off Coatings for

platers. Address Stanley Chemical Company, 81 Berlin St., East Berlin, Conn. Midwest representatives: Howell Industrial Plastics, Grand Rapids, Michigan.

Ask for FREE Bulletins on Stanley plating rack coatings.



STANLEY GHEMICAL

LACQUERS
SYNTHETICS
VINYLS
ENAMELS

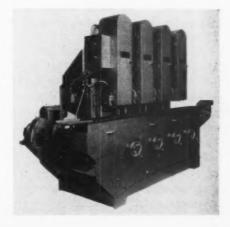
machine, permitting four simultaneous grinding operations, was designed for high-volume flat surfacing of ferrous and non-ferrous metals, glass, plastics, ceramics and other materials. Model 680-4 is claimed to produce extremely fine micro-inch finishes to exacting tolerances, and make possible a single-cycle operation from rough casting to polished part.

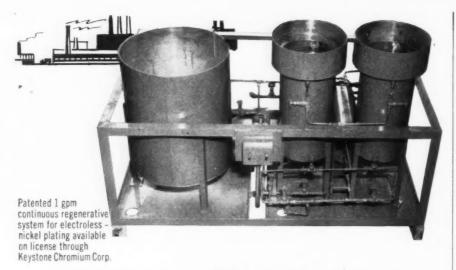
Typical multiple grinding sequence, using a series of progressively finer belts is: rough grind, two semi-finishes, and finish grind. One pass under the four heads can remove an approximate maximum of 0.020-inches of steel stock, and up to 0.060-inches for other materials and applications.

The machine is applicable to both wet- and dry-belt grinding. Approxi-

mate capacity of cooling unit, equipped with  $\frac{1}{2}$  H.P. coolant pump, is 100 gallons.

The machine is particularly adaptable to automatic production lines.





#### Now you can Kanigen® electrolessnickel plate in your own plant

Kanigen<sup>®</sup> Nickel-Phosphorus coating is a unique process for depositing a uniform, hard, corrosion resistant electroless-nickel coating on iron, aluminum or copper and its alloys by chemical (non-electrolytic) means.



Send for 12-page Kanigen® Bulletin for complete technical details.

#### Some UNIQUE PROPERTIES

- Accuracy even on complex shapes (uniform coating up to .007" eliminates post grinding)
- Hardness can be varied from 50 to 70 Rockwell C (here's extra surface hardness for aluminum or brass)
- Porosity is practically zero (superior to electro-deposited nickel of equal thickness)
- Intermediate or Bonding Coat (on metals and plastics....excellent solder base)

KEYSTONE Chromium Corp. Buffalo 13, N.Y. CHEMICAL AND ELECTROPLATED COATINGS

Parts can be conveyorized for presentation to the conveyor belt, automatically ejected, and carried to next operation. Size of machine conveyor belt is  $6\frac{1}{2}$ " by 216". Quick manual adjustment of conveyor belt speed is obtainable for settings of from 2 to 25' per minute.

Abrasive belt size is 6" x 80", and abrasive belt speed of individual heads is constant at 5,500 sfpm. Belt tension is adjustable by a simple twist of control wheels; and for extra operator safety, the machine will not run unless belts are tensioned.

The unit has a maximum piece capacity of 5" high, 6" wide, any length. This machine is 125" long, 51" wide, and 90" high, and weighs 5,500

pounds. Heads are powered with either 5 or 7½ H.P. drives, and the machine can be modified for five- and six-head applications. Magnetic chucks are optional.

#### Belt Polisher

Curtis Machine Corp., Dept. MF, Jamestown, N. Y.

Model DBA-IF Flex-A-Belt is a machine on which it is possible to perform any of the basic abrasive belt applications found in a grinding, polishing or deburring department, according to the above manufacturer.

The extension arm assembly can be rotated a full 360° on the motor hub for the most convenient operating position for the various applications. The

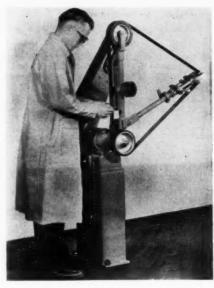


illustration shows a slack belt polishing or deburring application. Only on this machine, it is claimed, can the following operations also be performed: formed contact wheel grinding operation on a contoured piece; flat grinding application on a platen; direct contact wheel grinding operation with a work rest; grinding or polishing operation on a hard-to-get-at area with interference-free contact roll.

Designed for the industrial user, this multi-purpose unit has rugged construction, totally enclosed motor, sealed ball bearings, automatic spring loaded belt tensioning and positive belt tracking.

The device is a double end motor unit and is available in three varieties: with two arms; with one arm and one standard contact wheel grinding arm; with one arm and one side of the motor open for grinding wheel, buff or brush application. Additional information is available in circular A 1357

#### **Drum Sanders**

American Diamond Saw Sales, Dept. MF, 120 N. W. Ninth Ave., Portland 9, Ore.

All sizes Cone-Loc drum sanders are now available cushioned with Neoprene, according to announcement from the manufacturer.

Neoprene is highly resistant to oils, grease, kerosene and other petroleum products frequently used in connection with buffing, grinding or polishing operations. Consequently, the drum sanders can now be run in these liquids without swelling or softening effect on the rubber cushioning.

#### Low Pressure Boiler

Orr & Sembower, Inc., Dept. MF, Reading, Pa.

The new Power-Pak is designed to provide steam or hot water heating or hot water service with power demands of 10, 15, 20 and 25 HP. It is claimed to be the only unit of its type and capacity that meets A.S.M.E. standards of five boiler horsepower per square foot of heating surface throughout its full range.

The boiler is fully fire-tested before it is shipped, and can be equipped with either oil or gas firing equipment. It assures smokeless and efficient combustion, is automatically responsive to load changes, is quiet, clean and fast steaming.

It is the only unit of its type and capacity that meets standards of five square feet of heating surface (ASME) per boiler horsepower throughout its full range.

The boiler is delivered complete and ready for connection to power, water. and fuel supplies. The burner is completely mounted on the boiler. The ignition transformer is mounted on the air plenum. On oil-fired models, a single motor drives both the forced draft blower and the fuel pump. Safety valve, pressure control and gauges are easily accessible on top and at the side of the boiler; the motor starter is located at the right of the motor itself. Located below the easily removable, gasketed inspection and cleaning door at the front of the boiler is a peep sight through which the combustion process may be observed.

At the back of the boiler above the stack connection outlet, provision is made for tank or tankless heating coils, which may be added for hot

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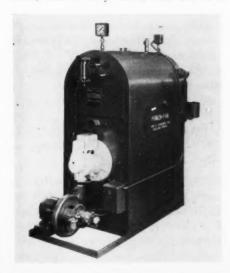
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add unrivalled prestige to your product with

# Electroplated GOLD FINISH

Cost of electroplating gold is fully in line with your other production costs — yet brilliant tarnish-proof gold adds permanent richness and intrinsic value you can achieve no other way.

With no more than mild damp-cloth cleansing, gold finish retains its beauty indefinitely. Besides decoration of elements of household appliances, electroplated gold is recommended as a complete over-all finish for toasters, percolators, clocks, small radios, etc.

Technic Inc. equips you with controlled apparatus and electroplating solutions to maintain exacting standards and close tolerances. We design and install your equipment for electroplating gold without waste — and our engineers stand by until performance is assured. Consult us without obligation, whether in respect to a new installation or an existing system now in use.

Att: DESIGN ENGINEERS

INDUSTRIAL GOLD has unique and diverse properties — physical, corrosion electrical, optical, corrosion in chemical, — not found in combination in resistant — form. One of these properties any other form. One of these properties — or a combination — may do a hitherto any other form. One of these properties — or a combination — may do a hitherto — impossible" job for you, or economically replace steps in your present operation. — write for data sheet: "Electroplated Gold" TECHN

39 Snow St., Providence, R.

39 Snow St., Providence, R. I. JAckson 1-4200 Chicago Office - 7001 North Clark Street

THE LARGEST ENTERPRISE OF ITS KIND IN THE WORLD

water service to baths, washrooms and other outlets. Return connection is on the side of the boiler at the water line and a blowdown or drain connection is built in at the bottom of the boiler.

The 10 HP oil-fired unit is 61" long, 34" wide and 66" high, and weighs 1,750 lbs. The 25 HP boiler is 86" x 36" x 74" and weighs 2,800 lbs.

Gas-fired 10 HP unit measures 67" x 34" x 66" and weighs 1,750 lbs. The 25 HP unit is 92" x 36" x 74" and weighs 2,800 lbs.

#### Impregnated Abrasive Buff

The Carborundum Co., Dept. MF, Niagara Falls, N. Y.

A new sectional impregnated abrasive buff has been developed for the

buffing of all ferrous and nonferrous metals.

Selected from several designs after exhaustive tests, this new pleated type sectional abrasive buff will be of significant interest to all regular users of traditional non-impregnated buffs. Heretofore, the greatest cost element has been for abrasive cake and compound in stick or liquid form, applied to the buff—ranging from 12 to 24 times the cost of the non-impregnated buff itself. The new impregnated buff is claimed to be a successful attack on this cost.

Engineered of specially-treated biased cloth, impregnated with selected abrasive grains bonded throughout its entire construction, the new sectional impregnated abrasive buffs are com-

#### Reconsider the source of your D-C power

# CONSTANT VOLTAGE TO YOUR TANK?



THER REACTRON DOES!

#### DOES IT ALSO GIVE YOU:

- Stepless Voltage Variation
- Single-knob fingertip control
- Small, remote operator's panel
- Static saturable reactor
- Advanced magnetic amplifier design
- Fast response and wide control range

THER REACTRON DOES!

#### AND AT LOWER OVERALL COST

#### Reduced Maintenance Cost:

THER REACTRON eliminates tap switches, vacuum tubes, motor driven brushes, arcing contacts, gears and other moving parts.

Write for technical study of REACTRON vs. TAP SWITCH or MOTOR DRIVEN VARIABLE AUTO-TRANSFORMER installations.

#### **Reduced Installation Cost:**

THER REACTRON integrates control and rectifier in same cubicle—requires no heavy cable between rectifier cubicle and operator's panel—features compact "portable radio size" operator's panel that's readily mounted almost anywhere without requiring floor space.



GERMANIUM

OR SELENIUM

It's THER . . . Whatever your D-C Requirement

#### THER ELECTRIC & MACHINE WORKS

ESTABLISHED 1915

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petitive to sisal buffs, in the finer grit sizes, for normal "cut-down" operations to prepare surfaces for color buffing or plating — or both. In the coarser grit sizes they are competitive to set-up wheels, coated abrasive belts,

Tampico brushes and other polishing and buffing devices.

These buffs can be altered by the use of conventional spacers to adjust cutting action and to provide greater coverage. Some potential applications may require widths up to 50". Normal side supports and flanges can be used.



American Diamond Saw Sales, Dept. MF, 120 N. W. Ninth Avenue, Portland 9, Ore.

A 12" diameter by 1" wide Cone-Loc drum sander has been added to the line of rubber cushioned abrasive drums according to announcement from the above manufacturer.

The sander is a rubber cushioned



split drum that permits the use of ordinary strips of abrasives in place of more costly endless belts or clipped end strips. Once the abrasive strips are in place the sander halves lock into a perfectly balanced abrasive wheel by means of a simple locking cone.

The new large diameter sander will permit users of narrow width abrasives to take advantage of the large diameter abrasive wheels.

#### Heavy Duty Floor Resurfacer

Flexrock Company, Dept. MF, 3665 Cuthbert St., Philadelphia 1, Pa.

This new heavy duty floor surfacer has been developed to resist the attack of acids, alkalis, water, oil, and grease. Rockflux is a practical finish for application over new, wet concrete, or for patching or resurfacing old floors at ½" or more.

The material is claimed to have three times the compressive strength and four times the serviceability of concrete. The above manufacturer says it makes a perfect bond to old concrete—making ½" patching or resurfacing practical and permanent.

The material is easy to apply and comes ready mixed in balanced proportions under laboratory control. Only water is added and it sets in 24 hours, eliminating costly maintenance problems.

This material is shipped in 100 pound water proof bags.

#### Bench Oven

Grieve-Hendry Co., Inc., Dept. MF, 1401-17 W. Carroll Ave., Chicago 7, Ill.

The need for a bench oven with large work space has been met through the introduction of Model 333, with working space of 36" x 36" x 36", and temperature range of 100° to 350°F.

Outstanding features include uni-





form temperature throughout by means of fan driven forced air circulation. An adjustable damper gives wide range of constant temperature.

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Construction is of heavy gauge steel with a minimum of 2" of Fiberglas insulation and Inconel sheathed tubular heating elements. Partlow non-indicating temperature controller is provided (indicating temperature controller available). Shelf supports are on 3 inch centers. Shelves are removable and can be inserted to fit each particular job, or removed for use of entire space if desired.

Outside cabinet dimensions are 40" x 40" x 43½" high. Available 220 volt, 1 phase, 60 cycle or 220/3/60, or 440/3/60. Timer, pilot light which shows when heating elements are on, automatic door switch that turns off blower and heaters when door is opened, are available.

#### Corrugated Board Tote Box

Convoy, Inc., Dept. MF, 3424 Navarre Road S. W. Canton, O.

A new series of stacking-nesting tote boxes has just been introduced. Bail handles of 7 gauge steel rod flip in for stacking, out and down for nesting, reduce storage space by 75%. The box itself is formed of "Chem-Board," the above manufacturer's name for their specialized process of rigidizing heavy duty corrugated board to remarkable strength.

Tote box illustrated is 19'' wide, 25'' long, 13'' deep, weighs but  $9\frac{1}{2}$  pounds and sells for under \$3.00 in quantities.

Features of low-cost, light-weight, strength, rigidity and moisture-resistance make the idea adaptable to a wide range of merchandise delivery, manufacturing operations and materials handling. Approximately 20 sizes are produced.



#### Vapor Degreaser

Aircon Division, Armstrong & White, Dept. MF, 223 Freeport Road, Cheswick, Pa.

A new model vapor degreaser has been added to the *Aircon* line of vapor degreasers. Known as the Model 75, it is suitable for both large and small plants where an economical permanent installation is desired for continual operation or as needed. This unit fills the gap between smaller, portable vapor degreasers and the larger, higher capacity degreasers.

A working area of 24" wide x 40" long x 24" high, combined with a fast cleaning cycle permits a load capacity in excess of 750 lbs. of steel per hour. Solvent requirement—16 gallons, boil-

ing sump—24 gallons storage. Suitable for either trichlorethylene or perchlorethylene solvents.

COMPOUNDS MADE IN BAR, SPRAY OR PASTE

Construction is of heavy gauge steel,



#### how to stop spotting out

on brass plate

spotting out
on thin copper or
brass plate
is your problem,
KENVERT No. 32
Chrome Sealer
is designed specifically
as a solution.

A KENVERT

No. 32 sample and detailed fact sheet (P-32)

is yours

for the asking when requested on your company

Write today to:

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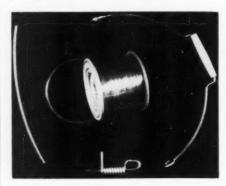
CONVERSION CHEMICAL CORPORATION

98 E. MAIN STREET, ROCKVILLE, CONN.

double seam welded, with a rust inhibitive interior coating. Operates on 220 v. AC only. Vapor line is maintained at 24" above the level of the solvent. Overall dimensions are 44" high x 40" long x 28" wide. Units are available with or without spray equipment. Crated Shipping Weight — 290 lbs. The degreaser lists at \$525.00 F.O.B. (less spray equipment).

#### Nickel and Brass Coated Steel Wire

National-Standard Co., Dept. MF, Niles, Mich.



Pre-plated with nickel (as shown) or brass, National-Standard wire is drawn to size. It withstands severe twisting.

Commercial availability of Fernicklon nickel-plated steel wire with up to 10 per cent nickel coat has been announced recently. Significant savings of scarce nickel are promised by the jacketed material. Brass-coated wire is available in sizes from 0.072-inch to 0.310-inch. It is recommended only for decorative effects in the furniture and accessories field.

Further information on this steel wire may be obtained by writing directly to the manufacturer at the above address,

#### Mono-Column Demineralizer

Penfield Mfg. Co., Inc., Dept. MF, 19 High School Ave., Meriden, Conn.

The new MA-500 unit, which operates on the extremely efficient mixed bed principle, produces up to 500 gph of super high purity water (effluent readings as high as 15 and 20 million ohms). Cost is only a few cents per 1,000 gals.

All operating functions, including the regeneration cycle, are fully automatic. When the effluent's conductivity falls below the desired pre-set standard, the unit automatically stops and the need for a regeneration cycle is signalled by a red light. Turning one

#### ULTRASONIC CLEANING BY THE SQUARE FOOT

Recent improvements in ultrasonic power-generating equipment, and the perfection of hermetically-sealed transducers operating at 40 kc/sec, have now made it economically feasible to apply ultrasonic cleaning to areas measured by the square foot. Up to now, cost and technical problems have largely confined the benefits of this fast and efficient technique to relatively small units.



The large, uniform radiating surface of the transducers makes them particularly suitable for the removal of buffing compounds, radioactive contamination, soldering flux, plaster, carbon smut, etc. The transducers can also be used for other processes such as quenching, plating, pickling, descaling and dyeing. The cleaning action penetrates deeply into blind holes and other areas difficult or impossible to clean by conventional methods.

The Branson LF-15 Transducers have a radiating surface 25/8 "x6", with thick barium-titanate driving elements that transmit the energy through the top of the stainless-steel housing directly into the cleaning solvent. The modular design of the transducers facilitates a wide choice of flush and focused arrangements of transducers.

Generator-Transducers combinations are available with radiating areas from ½ to 10 square feet:

SONOGEN® MODEL	TRANSDUCER CLEANING AREA
AP-25	1/4 Sq. Ft.
APT-100	1
APT-400	4
P-1000	10

Cost of complete equipment, per square inch of radiating surface, ranges from \$23 down to \$14. We will be happy to send you complete information on request.

#### BRANSON ULTRASONIC CO.

Division of Branson Instruments Inc. 21 BROWN HOUSE ROAD STAMFORD, CONN.



# abbot and the Million Shiny Buckles

The *abbot* studied the small watchband buckles. Each was stamped from stainless steel with nicely defined, square corners, evenly spaced decorative ridges and precisely placed pinion holes.

The little man's visitor wore a worried frown. "How," he asked, "can we put a good, shiny finish on a million of 'em, quickly and economically?"

In less than a week, the *abbot* mailed his meticulously typed reply. "Your watchband needs burnishing,"

he wrote, "Try barrel burnishing with Abbott 3/16" Diagonals. You'll find they are shaped to do the job right. Besides, the Abbott Method is fast, economical and thorough."

Abbott Burnishing Materials make effi-

Materials make efficient and uniform contact on metal parts and castings of every size and shape. Made from selected carbon steels, they are Deep Hardened with a glass-hard, mirror-like finish. Combined with the Abbott Vertical Barrel, they make the *perfect* barrel finishing combination.

Let the abbot show you how The Abbott Method can help you. Just drop a line to . . .



The ABBOTT BALL Company

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1052 New Britain Avenue Hartford 10, Conn. switch then actuates the regeneration cycle which completes itself entirely automatically, including rinsing and recutting-in the effluent when desired resistivity is reached.

One regenerant tank only is supplied; this is for the caustic solution. Acid draw-up is directly from container. Thus, an unusually safe method for handling acid is provided and danger of burns, spillage, etc. is eliminated. Proper dilution of the acid is accomplished by a special eductor.

The single column of the unit is constructed of a seamless steel tube,



100 per cent plastic-lined, with the famous Portsite feature. The unique construction of this material enables the operator to view the resin action within the column whenever desired.

The internal collector system is completely non-corrosive and has ample room for regenerant draw-off. The collector is located at the port and can be removed for inspection without removing the resins. All screens are lifetime Saran plastic.

Regenerant piping is 100 per cent non-corrosive eductors, non-corrosive valves where necessary, including plastic draw-up lines for both acid and caustic regenerants. Process piping is 150 lb. bronze pipe for all raw water lines, stainless steel or plastic on ail effluent lines.

The new demineralizer is exceptionally compact, requiring only 2' x 3' of floor space, and is shipped as a completely "packaged" unit — ready for immediate operation. Installation is only a matter of attaching influent to raw water source and effluent to points where pure water is needed.



# Luster-on

ALUMINUM SEALER

- ✓ produces a chromate film on aluminum that provides excellent corrosion protection and serves as an ideal paint base
- is an excellent substitute for anodizing in many applications where hardness is not a prime factor—gives better corrosion protection than anodizing.
- is easily applied at room temperature by dipping, spraying or brushing — treatment time extremely short.
- ✓ can be furnished in clear, yellow and dyed color finishes
- ✓ gives maximum salt spray resistance.
- adheres well, does not leach easily
- ✓ offers extreme economy of use
- √ meets government specifications
  MILC-5541

See for yourself the superior results obtained with new Luster-On Aluminum Sealer.

Send sample for free laboratory treatment.



58 Waltham Avenue, Springfield, Mass.

#### **Automatic Washing Machine**

Stoelting Bros. Co., Dept. MF, Kiel, Wis.

\* No residual matter or water marks are left on metal by this patented automatic washing machine, which runs virtually unattended, according to the above manufacturer. This purity of surface is obtained by a series of cleaning stages, which includes rinsing with de-ionized water. In prior washes an alkaline base detergent or acid is used to remove any accumulation of grease, dirt, grit or dust; and

this is followed by tap water rinses and drying cycles. The washer is so designed that all wash water solutions and rinse water can be re-used.

The machine provides a continuous straight-line, automatic work flow through the cleaning process. It prepares products for finishing operations or immediate packaging as they come off the conveyor belt. Each washer is designed to meet the space requirements of the individual purchaser. Cleaning operations, too, can be modified or changed to meet specific cleaning problems. The washer can be a

single conveyor unit or a multiple belt operation, as shown. These latter units are designed to carry a variety of products of assorted sizes and shapes. Each belt has adjustable speeds. Different blow-off points for air drying can also be set and readily adjusted to the user's needs. Final drying is by steam, electricity, gas or any combination of these. Another customized feature includes the size of required loading and unloading area.

The machine is said, by the manufacturer, to have a great potential for the cleaning of stainless steel and aluminum utensils, and for electronic and automotive components. It should also have application in any other industry requiring a spotless or bright finish on a part or product.

in a part of product.

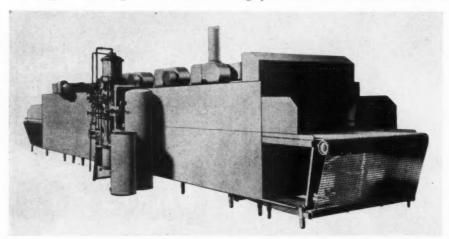
#### Orlon Filter Felt

Filtration Fabrics Div., Filtration Engineers, Inc., Dept. MF, 155 Oraton St., Newark 4, N. J.

By packing the interstices of a special Orlon woven fabric with short fibers of Orlon, the above manufacturer has developed a new felt with many interesting applications in wet and dry filtration. This new Feon filter felt combines high chemical and temperature resistance with very high bursting strengths, plus the fine filtering characteristics of a felt, at a cost approximately that of a wool felt. Principal applications will be in filter presses and dust collectors.

The material withstands temperatures up to 300 deg. F. It has excellent resistance to strong mineral acids and oxidizing chemicals, and is unharmed by most common solvents, oils, greases, and acid salts. It has fair resistance



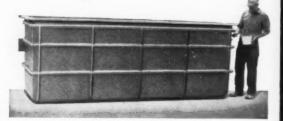


#### For Corrosion Resistance! Electrical Insulation!

of 30 BONATE TANKS

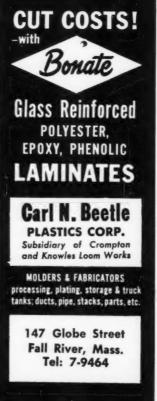
#### Each to Operate with:

- 5 tons of 15% Sulphuric Acid at 160° F.
- 10-ton load of anodes and electrodes on top rim!



#### Expensive Linings Unnecessary!

BONATE TANKS for the electrolytic recovery and refining of precious and other metals are meeting with great success in the refining and plating industries. Scores of tonks with actual acid-solution field experience at elevated temperatures prove-in BONATE as ideal! . . . tough, light-weight, dependable, trouble-free! Corrosive-resistant BONATE eliminates need for expensive linings . . . cuts costly maintenance. As a non-conductor, it results in a higher purity end product. Inquiries invited.



to weak alkalies. It is excellent for hot corrosive fumes.

The felts contain no bonding resin, hence may be used with confidence for any chemical or temperature problem where Orlon itself is recommended.

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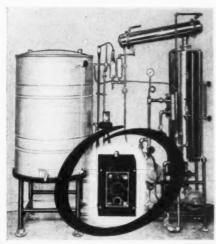
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The new material's felt-like structure retains film solids, yet has relatively high porosity permitting high filtering rates at normal pressures. In tests it has performed better than wool, it is claimed. The material is relatively easy to clean. It does not shrink, and keeps its shape well. Filter elements have edges and holes cut by an exclusive heat-sealing process which prevents unraveling. The material can be sealed in presses without excessive rim pressure, reducing the danger of "rimcutting."

The filter felt is available as yard goods, or tailored to fit any type of filtration or dust collection equipment.

#### Distilled Water Purity Controller

Barnstead Still & Sterilizer Co., Dept. MF, 2 Lanesville Terrace, Forest Hills, Boston 31, Mass.



The Puromatic Controller has been designed to control the purity of distilled water automatically. Operating on the conductivity principle, the controller constantly measures the purity of distilled water coming from a still before it enters the storage tank.

The operator simply sets the standard of purity required on the control device and only water of that purity or higher is permitted to enter the storage tank. Any water below the pre-set purity required is automatically diverted to waste. The distilled water already accumulating in the storage tank is thus protected from contamination. This continues until the condition which causes the impurities is corrected. The distilled water is then

automatically rerouted to the storage

It can also be used with the firm's complete line of water demineralizing equipment for protection when the ion-exchange resins become exhausted.

Setting is adjustable on 0-15 ppm scale. The complete controller includes purity meter, continuous flow cell chamber, thermometer, threaded glass conductivity cell, signal light, automatic diverter valve and fittings for effluent line.

The device is available on all of the firm's equipment or may be installed on existing equipment in the field.

#### Solenoid Valve

Airmatic Valve, Inc., Dept. MF, 7317 Associate Ave., Cleveland 9, 0.

The "In-Line" construction of the Airmatic 2-way direct solenoid controlled valve makes it easy to inspect and service. All control parts can be removed in one small assembly, without disturbing the piping, by lossening just one hexagonal nut. Primarily for alternating current applications (both pressure and vacuum) this "normally closed" valve is available in standard pipe sizes from 1/4" through 2". Having only two moving parts, it assures a positive, high-speed action with short plunger travel. Non-corrosive throughout, it can be controlled by a relay or a micro-switch, allowing the designer the choice of a complete



electrical system. It can be mounted in any position and operated continuously without harm to the valve or the solenoid.

#### **Neoprene Coated Work Gloves**

The Pioneer Rubber Co., Dept. MF, 296 Tiffin Road, Willard, O.

A completely new work glove line, flexible enough to meet virtually any industrial hand protection need, is now in production. Called Pacemakers, the new line incorporates 15 design innovations, each improvement a re-





sult of intensive tests by company engineers over a full-year period.

Each glove in the line is made of neoprene coated flannel in three different weights: light, industrial and heavy duty. In addition, there is a choice of knit wrist and 12-, 141/2-, and 18-inch gauntlet styles. Of special interest is the heavy duty "Hot 'N Cold" glove, which features two 8ounce shells, face-to-face napping for extra insulation, double-napped inner lining, bar-tacked fingertips and nonravel lockstitch binding on gauntlet. Light and industrial weight gloves are available in black, heavy duty in mahogany red with non-slip finish on palms and fingers.

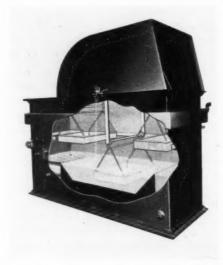
Further information may be obtained by writing to the manufacturer.

#### Vapor Degreaser

Phillips Mfg. Co., Dept. MF, 3539 West Touhy Ave., Chicago 45, Ill.

A new type vapor degreaser operates on the rotomatic principle, which permits a pre-determined and accurately controlled degreasing time-cycle. However, instead of simply a vapor degreasing operation, a cool dip rinse has been incorporated to wash off chips and other insolubles.

The dip cycle operates in two ways. The liquid solvent rinse gets back into blind holes and recesses in the work being degreased. In addition, the work is cooled so that in each complete cycle of baskets or tumblers (either available) there are two separate condensing vapor stages. The re-



sult is a very complete degreasing cycle which may be repeated, if need-

ed, to remove more stubborn soil than is usually encountered.

Straight work baskets are used where work is relatively free from recesses or the tendency toward nesting. If these conditions do exist, the unit is available with tumblers which provide thorough cleaning action. Time cycles are completely adjustable so that close control of cleaning can be kept, both from the standpoint of production requirements and economy of solvent. A flusher spray attachment is available if desired.

The units range in size from 1,800 to 4,000 pounds per hour and are available in electrically heated, steam heated, and gas heated models.

#### Backstand Idler

Curtis Machine Corp., Dept. MF, Jamestown, N. Y.

The BS Series, a completely new backstand idler is available for 4", 6" or 8" wide belts and can be easily set up as the belt idler for any grinding or polishing lathe.

The revolutionary simplified design features a foot pedal for belt tension release, which leaves both hands free for changing the belt. Positive belt control is assured with adjustable spring loaded belt tension and accurate tracking control. Sealed ball bearings in the 10" diameter pulley will give long trouble free service with speeds of up to 10,000 sfpm.

Easy to install, it can be mounted on either the floor, pedestal or wall without the use of adapters for operations on either the right or left side of a polishing lathe. The unit has sufficient adjustment to compensate for belt length, when different diameter contact





GOBLET BUFFS, TAPER BUFFS, CYLINDER BUFFS, SMALL POLISHING WHEELS, RAZOR EDGE BUFFS, and many others for deburring, polishing and grinding any internal contour.

Write for additional information or contact your local dealer. These buffs are stocked by many dealers throughout the country.

We manufacture a COMPLETE LINE OF BUFFS including full disc loose and sewed buffs and polishing wheels. Our metal center BIAS TYPE BUFF may help cut your polishing costs.

Your request on your letterhead will bring our complete catalog by return mail.

#### BARKER BROTHERS INC.

1660 Summerfield Street

Brooklyn 27, N. Y.

Canadian Distributor - LEA PRODUCTS COMPANY, Montreal



wheels are used, so that belt speeds of 5,600 to 7,500 sfpm are possible with a single speed 1,800 rpm lathe.

Remote tracking control and pneumatic tensioning are available on the idler at slight additional cost.

#### Rough Finish Coated Gloves for Use in Oil, Grease, Solvents

Surety Rubber Co., Dept. MF, Carrollton, O.



A new rough-finish coated fabric glove has been designed to provide a positive grip and withstand oils, acids and solvents,

The coating combines a vinyl base and "Sureseal" rough finish, affording highest resistance to all chemicals as well as resistance to cutting, snagging and abrasion. Fingers are curved for hand comfort and the wing thumb construction eliminates side seams and overcomes tearing out at the thumb.

Sold under the trade name, Griptite coated work gloves, they are available with coated palm and knit wrist or fully coated with knit wrist, twelve-inch gauntlet or safety cuff. Women's sizes with coated palm are furnished with knit wrist only.

#### Self-Closing Safety Drum Faucet

Protectoseal Co., Dept. MF., 1920 So. Western Ave., Chicago 8, Ill.

Designed specifically for the safe control of flammable liquids, this newly improved safety drum, faucet can be used with any type container that has a 3/4 in. bung opening. A swivel head permits the faucet to be screwed into the bung opening and when a firm, tight, threaded connection is secured, the pouring spout is easily swivelled to the correct position for use and tightened with a knurled locking nut. When tightened, the locking nut compresses a new type Teflonasbestos packing composition to prevent leakage at the swivel connection and secures longer life, leak-proof dispensing. The self-positioning design also eliminates the possibility of damage to threads by forcing the faucet to the correct position for dispensing, and eliminates the cause of leakage at this point.

A spring-mounted handle permits dispensing only when attendant is present. Flow liquid stops completely when handle pressure is removed. There is no possibility of attendant leaving the liquid running to permit overflow to gather on floors where it may be easily ignited. Hand pressure also compresses a spring actuated bushing against a packing compound in the plunger rod to prevent leakage at this point.

A cylindrical perforated brass flame arrester, which also serves as a strainer, is located within the faucet at the dispensing opening where it may be removed easily for cleaning or replacement without unscrewing the faucet. The flame arrester prevents exterior fire from entering and igniting the



contents of the container. Body of the faucet is non-sparking brass and the large lever type push handle is a cadmium plated steel stamping. A padlock opening permits the handle to be locked in closed position. Neoprene or Thiokol gaskets are normally supplied, but other gasket materials are available upon request.

#### Protective Skin Cream

Soluol Laboratories, Inc., Dept. MF, Natick, R. I.



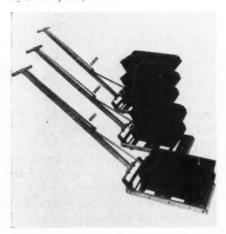
Solucone, a new heavy-duty, protective skin cream, developed specifically for industrial use, contains silicone as the protective agent, in an effective vanishing base. When applied, it is said to maintain a silicone protective barrier that prevents skin contact with external irritants normally encountered in industry. In cases where skin disorders had already occurred, the product has prevented the spread and speeded recovery. It is equally effective for wet or dry work and retains its protective powers even when skin is immersed in liquids for long periods. It will protect the skin from occupational irritations caused by most acids and chemicals. When chemical applications are accompanied by steam, the cream will wear off more readily, but will afford complete protection if applied more frequently. By forming a protective layer over



the skin, it prevents the skin from drying, but never leaves it slippery. The protective layer also prevents perspiration from coming in contact with the work and it keeps the hands fresh and clean. Even dyestuffs and lacquers wash off easily, leave no skin discoloration. The cream does not smear and will not affect the materials handled. It is packaged in sanitary tubes, individually boxed for easy handling and storing.

#### Tote Box Roller-Toter

Rolock Inc., Dept. MF, 1350 Kings Hy., Fairfield, Conn.



The manufacturer has announced production of a new and improved universal version of their tote box roller-toter, designated M o del GR. While the basic design of "George," which is patented, remains unchanged, detailed improvements in the new universal model permit its use with all the standard types and sizes of tote boxes. Refinements in the design of

the chassis and placement of rollers make the new model even easier to use. With this handling equipment, girls can easily load and roll away heavily loaded tote boxes.

#### Submersible Corrosion-Resistant Pumps

Eco Engineering Co., Dept. MF, 12 New York Ave., Newark 1, N. J.

A new mounting for submersible pump operation has been developed by the above manufacturer for its standard line of Type 20 alloy centrifugal pumps. Featured in the design is an all-Teflon adjustable thrust and guide bearing which eliminates the need for external lubrication. The fluid pumped acts as the lubricant, since the Teflon bearing is in rotation contact with a Teflon sleeve on the pump shaft. Thus the user is not confronted with the possibility of lubricant contamination or bearing failure due to improper or lack of lubrication.

Weighing less than 100 pounds, the entire unit is portable and can be readily moved by lift truck for discharging tanks at different locations. One pump can handle dissimilar chemicals since it is not limited by choice of bearing materials or lubricants. The combination of Type 20 stainless steel construction with the chemically inert Teflon bearing permits usage in severe corrosive service. Because of the basic submersible design, no problems are encountered with stuffing box leakage, mechanical seal failure or priming difficulties, as is the case with conventional pumps.

The vertically split, tapered bearing, identified as the "Colleton" is adjustable with a threaded Teflon lock nut and is similar in action to a machine tool collet. This type of assembly permits the removal of the bearing components without disturbing the pump shaft, impeller setting or pump housing.

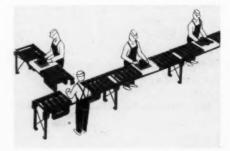
Furnished in heights to 60 inches from the base, pumps are furnished with statically and dynamically balanced, closed or semi-open impellers. Maximum particle size when handling suspensoids or slurries is  $\frac{1}{16}$  inch. Capacities to 45 gpm and heads to 50 feet.

#### Conveyorized Work Bench

Rapids - Standard Co., Dept. MF, Grand Rapids, Mich.

The Flow Bench is essentially a conveyorized work bench. This is claimed to be the first time standardized, interchangeable components have been offered at a price practical for almost every assembly need. The firm's flexible, standard parts can be rearranged into new lines at a moment's notice, quickly and economically.

The backbone of the device has been a combination of an exclusive live storage and live roller conveyor with pop-out rollers. Each work station



along the line is serviced by a Flow Rack unit designed to hold a predetermined number of parts, and by live roller conveyor set up to allow automatic accumulation of basic units requiring work.

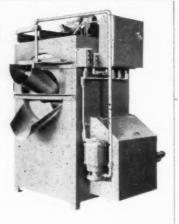
Rollers may be easily removed without use of tools from any point in the line for the establishment of work stations. If work stations must be moved, rollers are reinserted and the stations relocated. Another feature is the adjustable pressure arrangement which permits adjustment to desired belt and roller contact so that work can be transported or accumulated as desired. Safety for employees is a third feature. If a worker's hand gets caught between a roller and the belt,

# Now .. Wash Small Parts

#### in Bulk—Faster and at Less Cost! New A-F Small Parts Batch Washer

- . HIGH PRODUCTION IN SMALL SPACE
- ONE-MAN OPERATED

Parts batches are introduced through upper chute ... automatically discharged from lower chute—clean as whistle and flash-dried. High-pressure fanshaped spray nozzles and gentle helical spiral tumbling assure quick, low-cost cleaning.





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A-F ENGINEERED Cleaning and Finishing Machines
Plant-Wide Conveying Systems
Pre-Engineered Conveyors—Rollers, Wheel, Belt, Trolley

THE ALVEY-FERGUSON CO., 503 Disney St., CINCINNATI 9, OHIO and Azusa, California

the roller immediately pops out of its groove and injury is averted.

#### **Small Water Demineralizer**

Enley Products, Inc., Dept. MF, 1236 Broadway, Brooklyn 21, N. Y.



Low cost mineralfree water, equivalent in ionic purity and softness to distilled water, is now available from any water outlet with the new 'Perma-Demon' unit.

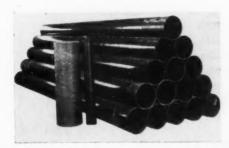
Capable of producing up to 100 gallons of mineralfr e e water before

ion-exchange material is exhausted, the unit is claimed to have the lowest initial and operating cost of any water demineralizer of its size and does not require cartridge replacement by the manufacturer. It is simply attached to any water outlet. Easily maintained, the unit permits exhausted ion-exchange material to be replaced by the user with fresh material obtainable everywhere.

This unit is ruggedly constructed of clear, break-resistant, high temperature plastic. Supplied complete ready for use. Priced at only \$19.95.

#### Fiberglas Reinforced Pipe

Valco Corp., Dept. MF, 1710 Roblyn Ave., St. Paul 4, Minn.



This high pressure pipe, reinforced with Fiberglas and utilizing epoxy and polyester resins, will successfully handle most acid and alkali liquids and fumes, according to the above manufacturer.

It is available in a complete range of sizes from 2" ID to 24" ID and larger, has a low fluid friction factor because of the smooth resin interior, and will not support the growth of fungi. It is lightweight (11/4 lbs. per foot for 3" pipe to 61/2 lbs. per foot for 8" pipe) and therefore easy to

install. Pipe is installed by means of a standard reinforced Fiberglas flange or a slip-on type of sleeve which is cemented in place.

Prices range from \$2.51 per foot for 3" ID pipe to \$6.40 per foot for 8" ID pipe.

#### **Barrel Handling Truck**

Valley Craft Products, Inc., Dept. MF, 770 Jefferson Ave., Lake City, Minn.

A drum and barrel truck, is said to make it possible for one operator to easily place heavy drums on pallets.

Designated Ezy-Rol barrel cart, the above manufacturer states that the design of this cart allows the truck's shoes to be placed on edge of the pallet so that in one forward motion the drum can be elevated to the pallet



with a minimum of operator effort. It is also said that drums can be safely lowered from pallets with this cart.

Another feature claimed for this cart is its spring operated chime hook

which drops over the barrel edge as the truck is moved against the barrel without the operator touching either the hook or the barrel.

The main frame of this barrel truck is constructed from heavy steel tubing with a 1" diameter axle. It is also available in aluminum where light weight is a factor such as in delivery service. Wheels are equipped with ball bearings to provide "easy rolling" regardless of temperature or weather conditions. Solid rubber tires or pneumatic wheels are optional.

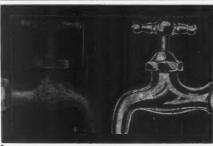
#### Parts Washers

American Machine and Solvents Co., Inc., Dept. MF, 9 Center Place, Yonkers, N. Y.

A new line of "Amasco" parts washing machines combines chemical action of the cleaner with mechanical action of work agitation to remove foreign matter thoroughly and fast.

It is claimed that air agitation, rolling boil, impeller stirring, even sound waves can not equal the overall efficiency of the shearing action developed by the rapid up-and-down motion of the submerged work. Be it a basket full of small parts or large single pieces, outside and inside, including cored passages, connecting or blind holes are scrubbed by the repeated powerful surge of fluid. Each new stroke carries away deposits and puts fresh cleaning solution to work.

Built for heavy industrial operation, a minimum number of moving parts is



# LUSTREBRIGHT Bright Nickel Process

Produces Brilliant, Lustrous Nickel Deposits.

Eliminates Color Buffing — Re-Cleaning — Re-Racking.

An Ideal Base for Chromium. Excellent Throwing Power.

No Special Solutions or Changes in Equipment Required.

Easy to Control — Low in Cost — Successful — Practical.

Uniform results obtained on all classes of work in still tanks or mechanical barrels. Excellent for zinc die-castings. Your present cold or lukewarm nickel solution will, with the addition of LUSTREBRIGHT, produce brilliant, lustrous, adherent deposits. Guaranteed

not to harm plating solution. Will not cause plate to peel, become brittle, or produce streaky deposits. Illustration shows unbuffed deposits produced before and after addition of LUSTREBRIGHT. Write for complete information.

#### W. C. BRATE COMPANY

125 TIVOLI ST. Est. 1860 ALBANY, NEW YORK

#### "IMMENSE VALUE"

"It is obvious from your first lesson that your course will be of immense value" writes plating foreman, John Armitage of the Automatic Electric Co. And it will be just as obvious to you when you enroll in this unique, easy-to-take, home study course in modern electroplating. Why not investigate? You can't lose! Write Joseph B. Kushner, Electroplating School, 115 Broad St., Stroudsburg 4M, PA., TODAY!



# GRIT

# MAIZE CELLULOSE

Best by test for use as a polishing, drying or burnishing medium on plated parts, stampings, ball bearings and for compounds, etc.

We have distributors of national reputation near your firm - write today for distributors' names.

Territory open for distributors.

#### KARR-MAIZE DIV.

923 E. Broad St. Columbus 5, Ohio

in a few seconds right at the tank.

Indicator AND control-colors on SAME strip. Control-colors in steps of 0.2 pH and 0.3 pH.
Plating ranges

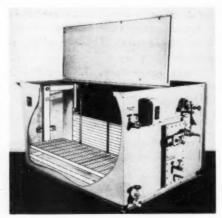
(200 strips of a range per box)

1200 3111p3 01	a range per box	
Acid:	Alkaline:	
*4.8-6.2 pH	6.6- 8.0 pH	
*3.6-5.0 pH	7.3- 8.7 pH	
*2.4-3.9 pH	8.6-10.0 pH	
1.0-2.8 pH	10.1-11.3 pH	
0.4-1.4 pH	11.0-13.1 pH	

\*Electrometric Values in Nickel Solutions. Each range is boxed separately.

#### PAUL FRANK

118 East 28th Street NEW YORK 16 Tel. MU 9-5286



used to reduce wear. Drive parts are away from fluid or travel of work, the linkage is simple, no obstructions to hamper operator.

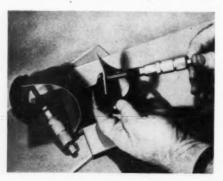
The washers are available to handle from 50 lbs to 2,500 lbs, and more per load; each size comes steam, gas or electrically heated, or unheated for cold solvent cleaning. Units can be combined to perform many operations, like wash and rinse, or rustproof.

#### Sprayable Plastisol

Metal & Thermit Corp., Dept. MF. Rahway, N. J.

Film thicknesses of 50 to 60 mils per spray coat, triple the thickness previously possible, can be obtained with a newly formulated sprayable plastisol. Known as "Unichrome Super 5300," the new coating makes possible gun application of the full solids content of vinyl plastisol without a diluent, the company reports. As a result, a pore-free 50 to 60 mil coat can be successfully applied in one layer which gives "sheet" protection to tanks, ducts and other large equipment, it is claimed. Because it is sprayed on, there are no seams or joints where corrosives might pene-

A compound based on vinyl resins. the material is resistant to the corrosive action of strong acids, concentrated caustic and salt solutions and other corrosive materials. Satiny smooth in



appearance, the material forms a tough, flexible film which absorbs impact without chipping, withstands abrasion and has desirable acoustical and electrical insulating properties. Field evaluation reports indicate that the new plastisol coating permits the substitution of ordinary metals for costly alloys.

#### Plastic Packaging Film

Minnesota Mining and Manufacturing Co., Dept. MF, 900 Fauquier St., St. Paul 6, Minn.

A new clear plastic film for packaging everything from acid to precision machine parts in tough heat sealable bags, is claimed to be the first durable plastic packaging material which exhibits the strength and resistance to oil found in polyester films and the resistance to corrosive fluids and the heat sealable properties of polyethylene films.

The film is chemically inert and



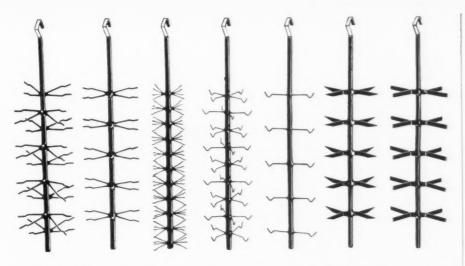
non toxic, and has excellent resistance to boiling and moisture and gas permeation. It also exhibits good puncture resistance and can be used for dry or wet packaging of machine parts with critical surfaces. It is heat sealable with a bond stronger than the film at 275 to 350°F. at 10 to 60 psi jaw pressure with a half to two seconds dwell. Tensile strength is greater than 15 pounds per inch of width.

The film, priced several times higher than cellophane and most other transparent films, is available in widths up to 22 inches and in lengths to order. It is 41/2 mils thick and will be supplied directly from the firm's St. Paul manufacturing plant on 30 days delivery nationally.

#### **Plating Racks**

Belke Mfg. Co., Dept. MF, 947 N. Cicero Ave., Chicago 51, Ill.

New Ready Made Economy Racks are stated to have better quality features at extremely low prices. These racks are really versatile and are de-



signed to handle any and all pieces. Their value is evidenced by such recognized quality features as the 100% copper spines; full amperage right to the part; all tips, wherever practical, are riveted and soldered or brazed for continuous conductivity and rigidity; every contact wire tip of phosphorus bronze; and, the 100% solids plastisol insulation is resistant to all plating cycles.

The above manufacturer has tooled up to produce their racks in huge quantities, with maximum quality at minimum cost. This saving is slated to be directly passed to the purchaser, as evidenced by the extremely low prices. They intend stocking them in large quantities so that immediate delivery can be made from stock without a moment's loss.

#### Blanketing Balls for Spray Control

W. D. Forbes Co., Dept. MF, 129 Sixth Ave., S. E., Minneapolis, Minn.

Fumes and mist can now be controlled with Plasto Anti Chrome spray balls. They are claimed to hold the spray down, thereby greatly reducing the chromic acid fumes. They can be used either alone or with control chemicals.

The balls are claimed to keep the heat in the tank because they form a blanket which is said to remain evenly spread, keeping the entire surface covered. Thus, uniform heat is maintained and gas bubbles do not form, which would throw spray into the air.

Made of polyethylene plastic, and impervious to nearly all acids, the balls are 15%" in diameter. Their size prevents lodging in the recesses of the work, and they do not stick to the racks. When the work is removed the balls do not cling, but roll off immediately, according to the above manufacturer.

The balls, which last indefinitely, are sold at \$100 per thousand. Tank requirements are figured at 55 balls per square foot of surface.

#### BUSINESS ITEMS

#### Richard T. Connors Appointed Cowles Representative in Chicago

Richard T. Connors was recently appointed technical service representative in Chicago and nearby cities by the Metal Cleaner Dept. of Cowles Chemical Co., of Cleveland, Ohio.

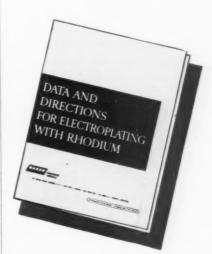
Connors is well known to many in



Richard T. Connors

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the Chicago area as a result of his long association with the sale of plating equipment and supplies there. He is a graduate chemical engineer from the University of Detroit and has had experience in all phases of metal finishing.

#### Viola Appointed to H-VW-M Board of Directors

James A. Viola has been elected to the board of directors at Hanson-Van Winkle-Munning Co., according to an announcement from the company.

Mr. Viola is currently engaged in directing the H-VW-M program of greatly expanding its rectifier manufacturing facilities and increasing its output of an improved type of germanium rectifier.

He is head of Rapid Electric Co. of New York, being the principal founder of this company when it was organized in 1945. In this connection he has served as consultant and lecturer to various technical groups in the country. He is responsible for a number of patents on rectifiers in the electroplating and associated fields.



James A. Viola

Mr. Viola was with the Western Electric Co. from 1941-45 as an electrical engineer. At that time he was engaged in research work on standard frequencies and other phases of quartz crystal. He received a Certificate of Merit from Western Electric as a result of his contribution to new developments and patents.

He is a graduate of the College of the City of New York, receiving his BS degree in Electrical Engineering in

#### Dr. McCoy Advances in Pennsalt's Technical Division

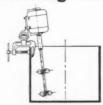
Dr. George McCoy has been named manager of the Pennsylvania Salt Mfg. Co.'s Research & Development Department, a major component of the recently created Technical Division.

Dr. McCoy, a native Philadelphian, attended the University of Pennsylvania where he earned his bachelor's degree in 1939 and the doctorate in 1943. Immediately before joining the company in 1914, he was an instructor in organic chemistry at the same institution. During his association with the company, he served successively as senior research chemist, group leader, assistant director and director of organic research.

A member of the American Chemical Society, Dr. McCoy is secretary of the Fluorine Sub-section of the Industrial Chemical Division of the national body. He is also a member of the American Section of the Chemical Society (London) and of the Organic Chemists' Club of Philadelphia. He is active in the affairs of the Uni-



#### Cleaning and Degreasing Operations



Mount Alsop Mixers to any tank or container -for any fluid mixing operations in your plant. Here's a speedier, low-cost way to clean and degrease your work parts. An Alsop Mixer will do all the work—it will drive and dash the solvent through and around the parts—cleans them faster, and far more efficiently.

Sturdy, dependable Mixers for any size or shape, new or existing Tanks; for single or multiple installations. Alsop Portable Mixers are easily and quickly mounted. Sizes 1/4 to 7-1/2 H.P

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versity of Pennsylvania and serves as vice-president of the Engineering Alumni Society and secretary of the Chemistry Department Advisory Committee.

#### Dixon & Rippel to Move

Dixon & Rippel, Inc. of Kingston, N. Y., manufacturers of fine wire scratch brushes for silversmiths and platers announce that, to celebrate their one hundredth year in business, they are moving into their new plant in Saugerties, New York (exit 20, New York State Thruway) on or about July 1, 1956.

The new factory will double the present manufacturing space and greatly facilitate production.

It is requested that all inquiries be directed to Box 116, Saugerties, N. Y. after July 1, 1956.

#### National Rack Appoints Preston

R. W. Preston's appointment to vicepresident of the Eastern Branch has been announced by National Rack Co. Mr. Preston first came to Naraco as a design engineer in 1948. He later went into the company's sales division, where he remained until his recent



R. W. Preston

promotion. In Mr. Preston's new duties he will also be assistant to the Eastern plant manager.

#### Niagara Falls Plant Expansion Planned by Stauffer

Stauffer Chemical Company has announced that it plans to invest a million dollars in an expansion and modernization of its Niagara Falls, N. Y., plant.

About \$400,000 of the total new in-

vestment will be for additional facilities to manufacture 73% caustic soda. Approximately \$150,000 will be spent to increase output of chlorinated solvents.

The company also plans to extend and improve several existing plant units which are now producing chlorine, caustic soda, titanium tetrachloride, silicon tetrachloride and zirconium tetrachloride.

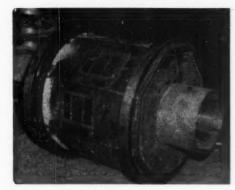
Work on the additions is now in progress. It is anticipated that they will be in operation by late summer.

#### New Method Available for Recovery of Chromic Acid Solutions

A patented method for recovering contaminated or spent chromic acid solutions, typical of chromium plating, anodizing, and copper stripping operations, has been developed by the Mutual Chemical Division of Allied Chemical & Dye Corp., and is being made generally available for industrial use without the requirement of any formal license, U. S. Patent 2,733,204 was recently issued covering this method.

The process involves ion exchange

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We're not asking you to commit yourself blindly with a large order. In fact, we're offering you a generous free sample so that you can give a wheel or belt a good competitive work out. Just fill in and mail us the coupon below. The sample of GRIPMASTER will be in your hands in a few days.

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treatment for removal of metallic contaminants of iron, copper, aluminum, and other metals by passing solutions through a cation exchange resin consisting of a sulfonated infusible polymerizate of a polyvinyl aryl compound. Such treatment on a hydrogen cycle permits recovery of baths which become inoperable due to excessive metallic contamination or reduction in acidity.

In relatively large operations the method is considered a useful engineering tool not only for decreasing the cost of chromium chemical treatments, but as a means of reducing costly waste treatment necessitated by increasing emphasis on eliminating stream pollution. Furthermore, it has been reported that the quality of plated and anodized work is improved by the use of these so-called decationized solutions. A number of companies are understood to be using this process and the necessary equipment can be obtained from several engineering concerns.

#### Glyco Appoints Cohen

Glyco Products Co., Inc. announces

the appointment of Samuel Cohen as its sales-manager.

Mr. Cohen received his B.S. degree from the College of the City of New York and his Master's degree in Chemistry from New York University. He spent twelve years in the research laboratory in the plant and the sales department of this company.

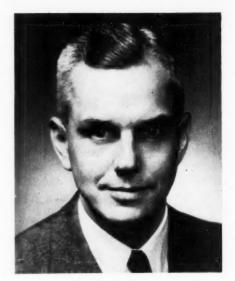
#### Research Branch of Alcoa Has New Name

The internationally recognized research branch of Aluminum Co. of America officially has been named Alcoa Research Laboratories. It is the world's most complete light metals' research facility and was founded in 1918.

With headquarters in New Kensington, Pa., ARL has branches in Cleveland, O., E. St. Louis, Ill. and Massena, N. Y. Total employment is more than 700.

#### Wemple Elected Director of Handy & Harman

Francis H. Wemple, treasurer of the company, was elected a director of Handy & Harman at the annual share-



Francis H. Wemple

owners meeting April 18th in New York.

Mr. Wemple joined the company processors of silver, gold, and platinum, in 1945; he served as assistant secretary and was elected treasurer in 1954.

#### A. C. West Elected by C.H.V.W.

Canadian Hanson & Van Winkle Co., Ltd., Toronto, announces the elec-

New! Improved!

NowBetterThanEver!

Presently being employed effectively both in job shops and manufacturing plants on hardware, lamps, furniture, oxidize finishes, etc.

Now maintain a completely uniform brass color with

# JELCO BRASS ADDITIVE

NON-CRITICAL • BOOSTS PRODUCTION • CUTS REJECTS

-Can be used in standard and high speed formulations . . . . still and barrel plating

- 1. Increases both efficiency and throwing power.
- 2. Produces brighter and faster plating.
- 3. Allows use of higher current density.
- 4. Retards anode polarization.
- 5. Eliminates cyanide and ammonia fumes.

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A. C. Wes

tion of A. C. West to vice-president and director. Mr. West, a graduate in chemical engineering from the University of Toronto in 1933, joined the company as chief chemist in 1934, was appointed assistant general manager in 1945 and general manager in 1955.

Pennsalt Announces Another Project in \$55 Million Growth Program

The Pennsylvania Salt Mfg. Co.

has announced expansion of chlorcaustic facilities at its Calvert City, Ky. works as part of its \$55 million growth program. The new unit will increase chlorine production from 50 to 150 tons a day with accompanying increase of rayon grade caustic soda production. It is anticipated there will also be an increase in caustic potash production.

With preliminary engineering completed and construction scheduled to begin in the near future, the new unit will go into operation during 1957. It will utilize facilities and services incorporated in the existing plant which was completed in 1953. Under a licensing agreement with Monsanto, it will employ the newest type deNora cell.

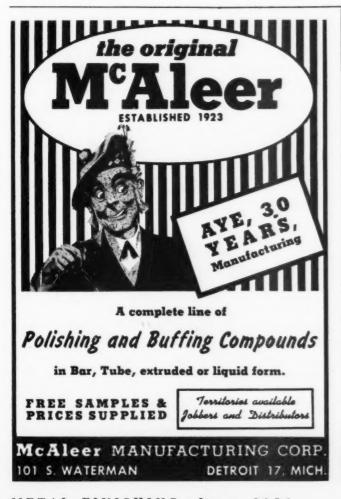
This expansion, combined with the hydrofluoric acid plant built in 1949 and the chlorofluorohydrocarbons unit presently under construction, will further strengthen a uniquely integrated facility at Calvert City for the production of a wide range of products based on fluorine and chlorine chemistry.

#### New Staff Assignments at Du Pont

Four new staff assignments in the sales and research divisions of the *Du Pont Electrochemicals Department* were announced by the company,

Samuel C. Harris, director of sales, was appointed to the new position of general assistant to the management of the department. Richard B. K'Burg, an assistant director of sales, was named director of sales, succeeding Mr. Harris. Arthur I. Mendolia, assistant director of research in the department, becomes an assistant director of sales, replacing Mr. K'Burg. Dr. H. K. Livingston, director of the Organic Chemicals Department laboratory at the Experimental Station, succeeds Mr. Mendolia as assistant director of research for the Electrochemicals Department. All appointments are effective April 1.

Mr. Harris, who is a graduate of Davidson College, Davidson, N. C., began his career with the company in 1917 as a timekeeper at the Chambers Works, Deepwater Point, N. J. He left in 1922 to become southern sales representative of the Roessler and Hasslacher Chem. Co., and, in 1926, was





made Philadelphia district manager of that company. Du Pont acquired Roessler and Hasslacher in 1930 and Mr. Harris remained as district manager of the R. and H. Chemical Department, now the Electrochemicals Department. In 1936 he was appointed assistant director of sales of the department and was advanced to director of sales in 1942.

Mr. K'Burg joined Roessler and Hasslacher in 1929 as a control chemist at the Niagara Falls, N. Y., plant. After Du Pont acquired the company, he went to Chicago as a salesman, later becoming district manager of the Chicago office and, in 1946, manager of the Detroit district sales office. He was transferred to Wilmington in 1950 as an assistant director of sales. a position he has held until now except for a short period in 1950-51 when he was an assistant director of production. He received his chemical engineering and master's degrees from Lehigh University.

Mr. Mendolia has been with the firm since his graduation in 1941 from Case Institute of Technology with a B.S. degree in chemical engineering. Starting as a chemist at the Niagara Falls laboratory, he went into production work in 1943 as a process develepment engineer and, after a number of advancements, became superintendent of the furfural products area of the plant. He was appointed technical superintendent of the east plant, comprising the furfural and vinyl products areas, in 1952, and was transferred to Wilmington in 1954, as assistant director of research.

Dr. Livingston started as a chemist at the Benger Research Lab. at Waynesboro, Va., in 1941. He was transferred to the Jackson Lab., Deepwater Point, N. J., the following year, where he was advanced through various supervisory positions to become assistant director of the laboratory in 1953. He was appointed director of the Experimental Station laboratory of the Organic Chemicals Department in February of this year. He received a B.S. degree in chemical engineering and an M.S. degree in petroleum engineering from the University of Texas, and a Ph.D. degree in chemistry from the University of Chicago.

#### Two ASRCO Executives Elected Vice Presidents

Two veteran executives of American Smelting and Refining Co. were elected vice-presidents by the board of directors at the annual meeting, April 24. Frederick Walker becomes vicepresident in charge of Federated Metals Division; Francis H. Eichler becomes



Frederick Walker

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#### DEAN THERMO-PANEL COIL

because it costs less, occupies less space, weighs less, costs less for maintenance, is more easily installed, is more efficient, and is preferable in every other way.

The picture shows how the Dean Thermo-Panel Coil can be made to fit perfectly into a tank, on hangers, ready to be removed quickly for cleaning at any time. You can't do that readily with old-fashioned pipe

Also made in spe-cial shapes such as "U's," "L's" and cial shapes such as "U's," "L's" and cylinders in a wide range of materials — iron, stainless steel, monel and other alloys.

All of the advantages of the remarkable Dean Thermo-Panel Coil are completely explained in

our Bulletin 355 — 52 pages. Price Data Bulletin 256 shows how you yourself can figure, compare, and do your own selecting, estimating, and designing. Also, our engineers will help you if you wish, and without obligation.

Backed by 20 years of panel coil manufacturing.

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vice-president in charge of the purchasing department. Both men will have their offices in the New York headquarters at 120 Broadway where they have been located in recent years.

Mr. Walker returned to the New York Office in 1953 as assistant to Vice-President Edgar L. Newhouse, Jr., head of Federated Metals Division. For the last year Mr. Walker has been



Francis H. Eichler

assistant to President K. C. Brownell and in charge of the Federated Metals Division. Mr. Walker joined the firm in 1930, was associated for several years with Revere Copper and Brass Co. in the sales department and, in 1937, after returning to ASARCO, he was appointed Pacific Coast sales representative with headquarters in San Francisco, In 1943, he was named general manager of the Pacific Coast for Federated Metals and moved to the Los Angeles office in 1950. Mr. Walker was born at Everett, Washington, and is a graduate of Stanford University.

#### James E. Trask Appointed by Minnesota Mining

Appointment of James E. Trask as head of the central machine design department of the engineering division has been announced by Minnesota Mining & Mfg. Co.

Trask will be responsible for providing machine design services for divisional engineering groups, including the new products division and the staff laboratories. The central machine design department is a new group within the enginering division.

Trask joined 3M in 1929 as a draftsman and, for the past 12 years, has been division engineer for coated abrasives.

#### Metal & Thermit Corporation Names New Plastisol Applicator

General Coating Co., Woodbridge. N. J., has been appointed a franchised applicator of Unichrome 5300 series materials, sprayable plastisols made by the Metal & Thermit Corp.

An organic coatings applicator for over 10 years, General Coating has wide experience in coating equipment such as tanks, fans, piping, and filter press plates. Special facilities include a private railroad siding, a ten-ton crane, one 36 x 14 x 12-foot oven, one 18 x 8 x 8-foot oven, and several tanks for plastisol dipping operations. The firm has engaged in dip plastisol operations for several months.

#### Engelberg Huller Names Chochran to Central Territory

Nicholas Chochran has been appointed sales engineer in the central territory for the Engelberg Huller Co.,



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For ALL Your



Nicholas Chochran

Inc., Syracuse, N. Y., manufacturers of abrasive belt machinery. He will make his headquarters in Chicago. His territory will include Minnesota, Wisconsin, northern Illinois, Indiana, and western Michigan.

Mr. Chochran was formerly associated with Minnesota Mining and Mfg., and is an alumnus of Northwestern University Class of 1952.

#### Ferro Corp. Erecting New Building

Construction of a three-story technical and engineering building has been started at *Ferro Corp*. in Cleveland, Ohio. Located adjacent to company headquarters at 4150 E. 56th, the building will be occupied by the Allied and Furnace Engineering Divisions.

This new building (63 ft. x 92 ft.) will contain over 16,000 sq. ft. of office space and will be finished in porcelain enamel curtain wall construction with red, yellow and blue colors.

#### Spanish Representative Named by Roto-Finish

Instituto Electroquimico, S. A. of Barcelona has been appointed Spanish representative of The Roto-Finish-Co. of Kalamazoo, Mich., to handle its machines and equipment for barrel finishing operations including mechanical grinding, deburring, descaling, polishing, britehoning, and coloring of forged, stamped, cast, and machined parts.

# Appointments Announced By Houghton

Three new managerial appointments have been announced by E. F. Houghton & Co. Charles A. Biller has been named manager, Foreign Sales Dept. He was formerly assistant manager and joined the company in 1952.

Armand J. Andre, previously a representative in the Chicago Sales Division, was named to the newly created position of assistant sales manager of the Southern Division, with headquarters in Charlotte, N. C. Andre has been with the company since 1939.

William Eismann, former supervisor of Lubrication and Rust Preventive Research, was appointed acting research manager, following the resignation of Dr. K. C. Frisch. Eismann joined the firm in 1937.

#### Univertical Expands

Univertical Foundry and Machine Co., Detroit, has just completed a major expansion of its office and plant facilities at 14841 Meyers Road, which brings total manufacturing and yard space to 42,000 sq. ft., equipped with



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#### S T O P Cleaning Problems

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D - 54

Water Soluble Deburring Compound

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three car rail siding.

The expansion featured the installation of five one-ton Detroit rocking electric furnaces and three one-ton gas fired furnaces. The electric furnaces for the production of nickel and copper anodes have a potential capacity of 7,500 lbs. per hour.

#### Wheelco Instrument Div., Barber-Colman Expands Services

Wheelco Instruments Division, Barber-Colman Co., announces the expansion of service facilities in the Philadelphia, Buffalo and New York areas.

John B. Moore and Edward W. Sullivan have joined the service engineering staff at the Philadelphia office.

The new service engineer with the Buffalo office is *James T. Shelton*, and *Walter Gilmore* is associated with the New York office in the same capacity.

#### Pangborn to Ship Blast Cleaning Abrasives in 50 Pound Bags

All users of blast cleaning equipment will be benefited by the recent decision of the *Pangborn Corporation*, Hagerstown, Md., to ship metallic abrasives in 50 lb. bags instead of cartons or boxes. Easier handling at the blast cleaning equipment is claimed plus greatly reduced breakage and loss in transportation and warehousing.

A new non-returnable pallet holding forty 50 lb bags can also be furnished.

#### Ampco Appoints New Pump Distributors

The appointment of two new pump distributors has been announced by *Ampco Metal*, *Inc.*, Milwaukee, Wis. The appointments are:

The Laidlaw Co., 1606 North Illinois St., Indianapolis 2, Ind. and Tri-State Mfg. Co., Inc., 208 S.E. Riverside Drive, Evansville 13, Ind.

#### Hugh Mallaney Joins Illinois Engineering

Hugh H. Mallaney has been appointed sales engineer for the Chicago area, for Illinois Engineering Co. He will be responsible for the engineering and servicing of the firm's line of steam and hot water heating equipment, traps, valves, and heat control systems.

Mallaney, a 1937 graduate of St. Viator College, Bourbonnais, Illinois, for five years was in the Chicago Branch Office of the Herman Nelson Div., American Air Filter Co., Inc.

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WITH PHOENIX COLD STRIPPER

Used Cold. Non-flammable.

#### Non-injurious.

For speedy removal of tough industrial paints, enamels, synthetics, lacquers, varnishes, wrinkles, dye markings, graphite, metal lithography, epoxies, and enamel wire stripping.

- . Apply by DIP SPRAY or BRUSH.
- . WATER FLUSH or RAG WIPE.
- . REFINISH.

#### PHOENIX COLD STRIPPER

- ★ Will not affect precision parts of ferrous and non-ferrous metals, wood or glass.
- \* Non-corrosive, Non-evaporating, Non-toxic.
- ★ Does not lose strength through usage. Just add new stripper to replace drag-out.

#### Salvage Expensive Rejects At Low Cost!

Write for SAMPLES and QUOTATIONS, or ORDER 5 GALLON AT DRUM PRICE.

# PHOENIX ABRASIVE & CHEMICAL CO.

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A barrel load of
bright nickel
with a nickel's
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# CORROSION RESISTANCE UP 30% TO 100%

With Nickelite you can get 13 to 22 hours of salt spray exposure with 0.00006 inch of barrel nickel, instead of 11 to 13 hours. Actual salt spray tests show even greater improvement with thicker deposits. And you're saving money, too!

#### WRITE FOR FREE FOLDER ON MODERN BARREL PROCESSES



Concentrated to quadruple strength — you don't ship, store or handle water! Shipping weight cut 275% — no deposits, no carboy returns. Stable, efficient, easily stored, easily used — a capful of Nickelite is enough for a barrel load of nickel.

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NEW YORK 3

Illinois Engineering is a wholly-owned subsidiary of AAF.

#### New Address for Detroit Technical Section of International Nickel Co.

The office of the Detroit Technical Section of the *International Nickel Co.'s* Development and Research Division is now located at 19842 James Couzens Highway, Detroit 35, Mich. The telephone number is BRoadway 3-6780.

F. J. Walls is in charge of the office.

#### Robertshaw-Fulton Division Names Director of Engineering

Appointment of Vernon H. Vogel as director of engineering for Aeronautical Division of Robertshaw-Fulton Controls Co. was announced recently. The post is newly-created to unify several engineering functions and to implement a project approach linking the developmental and production activities of the division.

Mr. Vogel received his B.S. degree in electrical engineering at the University of Wisconsin and is a member of the Institute of Radio Engineers, an honorary member of Eta Kappa Mu, and a member of Kappa Eta Kappa.

#### Allan Lee Joins Pennsalt Chemicals Staff in Canada

Allan H. Lee has become a member of the technical sales staff of Pennsalt Chemicals of Canada.

Mr. Lee earned the B.Sc. degree of Queens' University in 1952, specializing in metallurgy. Until his recent appointment, he was a technical service representative of Canadian Industries Ltd. In that capacity his work was concerned largely with the metal industries.

With his office at the firm's headquarters in the Harbour Administration Bldg., Hamilton, Ontario, Mr. Lee will service accounts in the metalworking industry where chemicals are used in the cleaning and finishing processes.

#### Two Receive Armour & Co. Awards

R. L. Reeves, divisional general manager of the Coated Abrasives Division of Armour & Co., presented awards for outstanding leadership in



Leo J. Urschler, left, receiving trophy from Robert L. Reeves.



Merle K. Shetler, left, with his father, also a member of the Division.

# Prompt Delivery NICKEL ANODES

NICKEL SULFATE NICKEL CHLORIDE NICKEL CARBONATE COPPER CYANIDE

All Plating Chemicals
Automatic Plating & Polishing Equipment

# IRITOX CHEMICAL COMPANY

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**WAtkins 4-1977** 



the selling profession during the recent three day general sales conference held at the Elks Club in Alliance, Ohio.

Leo J. Urschler, who is district sales manager for the Milwaukee area, received the trophy for outstanding sales program during 1955. Merle K. Shetler, of Alliance, Ohio. received the trophy for highest dollar volume sales in 1955.

#### Blakeslee Agent Adds Metal Finishing Department

G. S. Blakeslee & Co. announces that its exclusive agent in the Southeast, the F. H. Ross & Co., has formed a new metal finishing department. Although Ross has been handling Blakeslee degreasers, metal parts washing machines and degreasing solvent for the past 13 years, they have just set up this new department devoted exclusively to metal finishing. This department is to service metal fabricators and finishers in Southeastern United States.

J. M. (Jimmie) Ross will be sales manager for this division. The new operation includes engineering as well



J. M. Ross

as a sales department to handle customer sales and problems quickly and efficiently.

#### Detrex Corp. Appoints Emmett to Board of Directors

Detrex Corp., announces the appointment of John P. Emmett to the board of directors. Mr. Emmett joined the corporation in 1941 immediately

after receiving his B.B.A. from the University of Michigan. Mr. Emmett's assignment in the company's operations is as special assistant to the president.

#### Five New Representatives for Dean Products

The Thermo-Panel Div. of *Dean Products*, *Inc.*, Brooklyn 38, N. Y., announces the appointment of the following representatives:

- Cameron Engineering Co., 420
   Market St., San Francisco 11,
   Calif., E. C. Paul Robinet —
   to cover the northern half of California, and only the county of
   Washoe in Nevada.
- Allan Edwards, Inc., Box 7218, 2445 S. Jackson St., Tulsa, Okla. —A. J. Edwards, Jack S. Osborn, Bruce B. Pettigrove, Bill W. Jones, C. E. Shilling, Joseph C. E. Schumacher, and Dan B. Mathey — to cover the complete state of Oklahoma, complete state of Arkansas, and the northern part of Texas.
- 3. Thermal Specialties Co., 11 N. 14th St., Box 1142, Harrisburg, Pa. B. Zaritsky and Seth B.

#### **ACID ADDITIVE #7073**

Assures complete and uniform removal of hot rolled or heat treat scale — rust or oxide film.



#### **ACID INHIBITOR "T"**

Completely protects clean metal surface of iron and steel — prevents pitting and acid embritlement — leaves no scum.

#### ACID ACTIVATOR "DX"

Insures uniform wetting — sure removal of surface oxides — promotes free rinsing — prevents scum, oils from interfering with uniform cleaning.

Send today for bulletins



INDUSTRIAL CHEMICAL COMPANY Canton, Connecticut

# NEW!

An Effective Aid

to

QUALITY CONTROL OF PLATING



1 roll 50 feet long x  $\frac{1}{2}$  inch wide, in convenient plastic dispenser (with ample supply of buffer powder).

Price \$5.00

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Wood — to cover the central part of Pennsylvania.

- 4. Merlo Steam Equipment, 1506 E. State Fair, Detroit 3, Mich. Anthony A. Merlo, Raymond R. Paschke and Joseph S. Florek to cover the eastern half of Michigan.
- J. F. Munn Co., 104 Market St., Pittsburgh 22, Pa. — J. F. Munn, covering western tip of Maryland — western part of Penn.; almost the complete state of West Virginia.

#### Minnesota Mining Promotes Meyer

Promotion of *Vincent Meyer* as assistant division engineer for coated abrasives has been announced by *Minnesota Mining & Mfg. Co.* 

Meyer has been with the coated abrasives engineering group since 1948, when he received his B.S. in mechanical engineering from the University of Minnesota.

#### Hamner Joins Parker Rust Proof

Parker Rust Proof Co., announces the addition of D. H. Hamner to the



D. H. Hamner

staff of the Automotive Division, Technical Service Department.

Mr. Hamner comes to the company with over twenty years' experience with General Motors in the field of production metal finishing and painting.

#### Pennsalt Announces Executive Appointments

Joseph J. Duffy, Jr. has been appointed manager of Executive Pro-

curement and Development of the Pennsylvania Salt Mfg. Co. In this newly created position, Mr. Duffy will report to Fred C. Abbott, manager of Administrative Services. He will be responsible for the procurement of technical and professional personnel and the coordination of a company-wide executive development program.

Mr. Duffy joined Pennsalt as a student trainee in 1937 following graduation from Villanova University where he majored in Chemical Engineering. He served subsequently as salesman, assistant sales manager and sales manager of the Chemical Specialties Division. Since 1950 he has been manager of the firm's Metal Processing Chemicals Dept.

Concurrently, it was announced that John M. Davidson, assistant manager of the Metal Processing Chemicals Dept., will succeed Mr. Duffy. Mr. Davidson, a graduate of Dickinson College and one-time chemistry instructor, has been associated with the sales organization since 1946 when he was separated from the U. S. Navy with the rank of Commander.



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CHROMIC ACID CONSUMPTION UP TO 50%



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- . DO NOT STICK TO RACK
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- . KEEP HEAT IN TANK
- LAST INDEFINITELY

55 BALLS PER SQUARE FOOT OF SURFACE.
PRICE — \$100 PER THOUSAND

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#### Manufacturers' Literature

#### **Cleaning Materials**

Oakite Products, Inc., Dept. OF, 1001 E. First St., Los Angeles 12, Cal.

The above firm has issued a folder which tells about the job this cleaning concern is doing for the industry, and lists six of the booklets available on precleaning, electroplating, rust stripping and rinsing. A reply card is \_ .- Esbec Barrel Finishing Corp., Dept. included for obtaining copies of the booklets.

#### Portable Plating Unit

Bart-Messing Corp., Dept. MF, 229 Main St., Belleville, N. J.

New catalog sheets illustrate and describe the Sel-Rex "Jet" Plater, a complete electroplating plant in a compact, portable cabinet.

Details and specifications are presented in an interesting, easy-to-read manner, with lines directing the reader to the location on the streamlined cabinet of the components being described.

#### **Polishing Compounds**

McAleer Mfg. Corp., Dept. MF, 101 S. Waterman, Detroit 17, Mich.

Technical data sheets explaining the various basic properties of polishing compounds are available upon request from the above manufacturer. These technical sheets. No. 561 and 562. cover polishing grease-stick compounds, abrasive belt lubricants and other buffing and polishing compounds.

#### **Barrel Finishing Compounds**

MF, 18 Beech St., Byram, Conn.

A new, two-page folder has just been released covering specifications and application information on fourteen different color-coded compounds and abrasives. Of particular interest is a unique compound-use chart included in the folder. This chart is a quick, handy reference for determining recommended compound types for various materials and different finishing operations.

The free folder also includes full information on the exclusive colorcoding features of the company's compounds and abrasives.

#### Plate Coils

Thermo-Panel Div., Dean Prod. Co., Dept. MF, 616 Franklin Ave., Brooklyn 38, N. Y.

Subjects included in 52-page Bulletin 355 are operating pressures; industrial heating; heat transfer coefficient; choosing Dean Thermo-Panel Coils; pipe coil comparison method; capacity table method; heating problems; determination of Delta T; wall and surface losses; material load; spray and makeup loads; pressure drop; number of embossings; weight; charts; conversion tables; etc. On the back cover is a list of 34 typical applications.

#### Remote Electrical Transmission System

Simplex Valve & Meter Co., Dept. MF, 7 E. Orange St., Lancaster, Pa.

The Orthoflow system for the accurate and rapid transmission of metering data from one location to another has been graphically illustrated in Bulletin No. 700.

This well-documented 16-page bulle-



#### REFINERS - BUYERS - SELLERS - CONVERTERS ANODES - LOW MELTING ALLOYS CADMIUM — BISMUTH NICKEL—NICKEL ALLOYS COPPER — ZINC Ball or Bar Anodes in All Metals We Buy For Our Refining and Alloy Plant Pure or Offgrade CADMIUM DROSSES NICKEL ALLOYS PEELINGS PEELINGS RESIDUES ON IRON SKIMMINGS ON BRASS SPILLS ON COPPER RACKS BATTERIES BASKETS ALL FORMS WRITE - WIRE - PHONE UNITED REFINING & SMELTING CO. 3350 W. FRANKLIN BLVD... CHICAGO 24. ILLINOIS Phone: NEvada 2-1400

tin describes the versatility of the system for transmission of flow data, liquid level data, or pressure measurement data. It contains diagrams of each type of application plus dimensional drawings and capacity charts.

#### Mixers and Coagulators

Infileo, Inc., Dept. MF, Tucson, Ariz.

Guesswork has been eliminated in selecting liquid mixing and coagulating equipment according to Bulletin W-700. How to select proper equipment of this type and the advantages of "Vorti" mixers and "Vorti-Floc" coagulators are outlined in this eight-page illustrated bulletin.

#### **Anti-Rust Paints**

Speco, Inc., Dept. MF, 7308 Associate Ave., Cleveland 9, O.

A new 2-color bulletin, LL-2855, describes Rustrem anti-rust paints. Made in the form of a handy self-mailer, it contains detailed information about applications, prices and shipping data. Also included are numerous application photos showing both interior and exterior uses.

#### **Corrosion Resistant Floors**

Atlas Mineral Products Co., Dept. MF, Mertztown, Pa.

Bulletin 3-3 explains in detail the firm's two standard corrosion-resistant industrial floors. Complete estimating data is available with a thorough explanation of the differences in construction for both types of floors.

#### **Chemical Catalog**

Fisher Scientific Co., Dept. MF, 383 Forbes St., Pittsburgh 19, Pa.

Through a single book, the 1956 Fisher Chemical Index, laboratories have at their command over 7,300 chemicals — everything from "workhorse" technical grades to radio-active reagents and unique spectroscopically-pure solvents.

The 370-page book lists almost every chemical that is commercially available and of use to science. A handy reference book, it gives structural formulas, formula weights, melting and boiling points, and color-index numbers.

The new edition (Catalog 120-C) is available free of charge to laboratories.

#### Dry Type Air Filter

American Air Filter Co., Inc., Dept. MF, 215 Central Ave., Louisville 8, Ky.

A new bulletin describes the Auto-Airmat, automatic dry-type air filter. Bulletin No. 234-C explains its application, operation, construction and performance characteristics.

#### Surfactants

Carbide and Carbon Chemicals Co., Dept. MF, 30 East 42nd St., New York 17, N. Y.

A new 40-page data folder on Tergitol surfactants describes seven nonionics and four anionics. Besides the information on physical properties, shipping data, and specifications, performance data are included on wetting, penetrating, cleaning, and sudsing action, and lime soap dispersing power. Test methods used in obtaining performance data and specifications are given.

In addition, there are many suggested formulations as guides to the use of surfactants in detergents and cleaners, latex paints, metal polishes, and specialty products.

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Dr. Ralph A. Schaefer, technical advisor to the president of the Cleveland Graphite Bronze Co., and past-president (1955-56) of the American Electroplaters' Society, was a visitor

on the West Coast early in May. He attended the convention of The Electrochemical Society in San Francisco April 30 to May 3, and spent the following week in the Los Angeles area making customer contacts and arranging for direct representation on the West Coast for the Cleveland firm.

Dr. Schaefer attended the May 9 meeting of Los Angeles Branch of the A.E.S. where he declared himself enthusiastically in support of Los Angeles Branch's efforts to sponsor the 1960 A.E.S. convention. "There is a large

segment of the A.E.S. membership in favor of holding the 1960 sessions in Los Angeles," Mr. Schaefer said. "I hope it is, and I feel it will be, assigned to Los Angeles."

Another eastern visitor to Los Angeles in May was Richard M. Crane. vice-president of Lea Mfg. Co., Waterbury, Conn. Mr. Crane spent a week in Los Angeles and vicinity as part of a month's flying trip which took him to Portland and Pendleton. Ore., Seattle, San Francisco and Los Angeles. He attended the May A.E.S. meeting in Los Angeles as the guest of Roger Sundmark of Sundmark Supply Co., which represents Lea products in the area.

Jack W. Schultz, head of Jack W. Schultz & Co., Los Angeles, manufacturers of industrial cleaning compounds and distributor of plating shop equipment, reports the appointment of Ray Rosenthal as sales technician and promotional director.

Rosenthal was formerly active in sales engineering capacities for the Supreme Products Co. of Chicago, Ill, He makes his headquarters at the Schultz & Co. general offices, 7550 Melrose Ave., Los Angeles,

The Norton Co. of Worcester, Mass., manufacturers of abrasives and grinding equipment, held open house May 7 to 9 to mark the formal opening of its new Southern California plant and offices at 2525 Lafayette St.. Los Angeles. The building was acquired by the firm two years ago and converted for grinding wheel manufacture as the first West Coast facility to produce a complete line of grinding wheels and diamond wheels.

On hand from New England head quarters for the ceremonies were Milton P. Higgins, president; Ralph F. Gow and Ralph M. Johnson, vice-presidents; John Jeppson, vice-president in charge of manufacturing, Abrasives Division; Donald L. Price, sales manager; and E. B. Knowlton, public relations director. George A. Garrison is west coast plant manager.

P. A. Malling, sales engineer for the Osborn Mfg. Co. of Cleveland, O., in the Los Angeles area, has been promoted to district manager, coincident with the elevation of the Southern

#### "ROCKWELL" Greetings

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# MACARR, inc.

2460 ARTHUR AVE. NEW YORK 58, N. Y. WEllington 3-2643 California office to district status. The firm produces a varied line of brushes for the metal finishing and other industries. Malling, who has been with the organization since 1932 will direct the company's sales territory in California, Oregon, Washington, Utah and Arizona from headquarters located at 5411 Whittier Blvd., Los Angeles.

J. W. Guthrie Co., which has offices in Los Angeles and San Francisco, has been named representative in the Pacific Northwest for the R. M. Hollingshead Corp.'s line of cocoon sprayable plastic coatings. Guthrie Co. has handled Hollingsworth California sales since the firm's Sunnyvale, Calif., plant was opened last year.

Rheem Automotive Co. announces that its chemical processing and metallurgical departments have been consolidated under the direction of Dale F. Mason as technical control manager. Mason was formerly in charge of chemical process control for the firm. Ira Hayes, formerly analytical chemist, has been moved up to the post of chief chemist, and the metallurgical staff, headed by Edgar Brooker, has

been expanded to handle the increased scope of the firm's metallurgical program. Rheem manufactures and finishes automobile bumpers in a recently completed automatic and semi-automatic plating line.

C. W. Husband, one of the four brothers who operate C & W Metal Finishing Co. at 3525 S. Greenwood Ave., Los Angeles, reports that work has been completed on the installation of some \$40,000 worth of new plating and polishing equipment. The major item among the new facilities is a fully automatic rotary polishing machine.

The plant is equipped to do decorative chromium work, cadmium and zinc plating, both barrel and still, automatic polishing and diecasting. The work handled is chiefly on plumbing and automotive parts. Plans are underway, Husband reported, for equipping a section of the plant for production of building hardware.

C & W Metal Finishing Co. is another example of the amazing growth experienced by plating firms in Southern California, C. W. Husband and

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brothers Cliff, Bill and Ray found themselves in the metal finishing business in 1946 shortly after they had returned from military service. Cliff started it by taking on some small polishing jobs and doing the work in that part of the family garage which was not taken up by the car. Today they operate a plant valued at \$130,000 which is housed in two buildings totaling 13,000 square feet of floor space.

Dramatic metal-finishing and processing displays at the recent Motorama sponsored by the General Motors Corp. at the Los Angeles Pan-Pacific Auditorium featured a miniature plating line which operated identically to the massive finishing setups used by GMC in its various plants for plating bumpers, grilles and other decorative hardware on automobiles. The midget plating line was equipped with tanks of transparent plastic to enable spectators to observe the plating process. Items processed at the Motorama were gold-plated souvenir keys.

The Norton Co. of Worcester, Mass., has appointed Jack A. Heath as field

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engineer in Southern California, with headquarters in the firm's Los Angeles office. Heath joined the company in 1955 after a number of years activity as a journeyman toolmaker and salesman for a mid-western tool manufacturer.

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Tieing in with the beginning of Chemical Progress Week April 30 to May 7, Raymond L. Geiler, president, A. R. Maas Chemical Co. of Los Angeles, and chairman of that city's Chemical Week Committee, revealed that new plant construction by the chemical industry in the Los Angeles area, plus projects definitely planned for the near future, represent an investment of \$114,545,000. Geiler disclosed that projects totaling \$68 million are under construction and scheduled for completion in 1956 and 1957; and plans are in the making for other projects costing an estimated \$21 million.

Currently, according to Geiler, the chemical industry in the area is spending 25% of the entire total which is spent for basic research by all industry. He estimated that 800 chemical and allied products industry plants are in operation in Southern California.

W. B. Jennings, formerly attached to the plating room staff of the General Motor Corp.'s Kansas City, Mo., assembly plant, moved to the West Coast in March and is now one of the plating crew at Hughes Aircraft in Culver City, near Los Angeles, working under plating supervisor Al Sulzinger.

#### Associations and Societies

#### AMERICAN ELECTROPLATERS' SOCIETY

#### Newark Branch

The March meeting of the Newark Branch was held on the 16th with a goodly turnout for Ladies' Night in spite of the biggest snowfall of the year. Nine applications for membership were accepted and four were elected into the Branch — Raymond Sileneck, National Electric; Joseph Vouglas, Federated Metals Division; Irving Bernstein, Chemclean Products;

and Gerald Van Tilburg. The American Metal Co., Ltd.

Robert Ehrhardt, chairman of the nominating committee, placed in nontination the following officers who were duly elected:

President — Clifford Struyk. 1st Vice-President—William Grigat. 2nd Vice-President — Gustave Bittrich.

Secretary — D. Gardner Foulke. Treasurer — George Wagner.

Librarian — Dodd S. Carr.

Sergeant-at-Arms - Fred Meyer.

Board of Managers — Thomas Austin, John Gumm, Robert Horrocks, George Reuter.

Delegates — D. Gardner Foulke, William Grigat, George Wagner.

Alternate Delegates — Gustave Bittrich, Louis Donroe, John Gumm.

National First Vice-President, Dr. Samuel Heiman installed the officers and, after greeting the ladies, gave a brief report on Society affairs, including the showing of colored slides of the office and personnel. After appointing William Grigat chairman of the 1956 Christmas Party Committee, President Struyk turned the meeting





over to Librarian Bittrich, who took charge of the bingo game. Winners of prizes donated by G. Wagner of Hy-Grade. D. Clarin and J. Banta of Oakite, G. Bittrich of Bell Labs.. D. Carr of Bart Labs., D. Foulke of H-VW-M. C. Struyk of General Chem. and F. Meyer of MGM Records were Mesdames Bittrich, La Manna, Abazia, Miss Meyer and Messrs. Grigat. Kovatis and Bernstein with Mrs. Carr winning the grand prize - a clock radio supplied by the branch.

The meeting concluded with a movie shown by Howard Cobb, and refreshments.

> D. Gardner Foulke Secretary

#### Indianapolis Branch

The April 4th, 1956 meeting proved that branch member participation can bring out attendance. The program for this meeting was given by the committee which is in charge of the "Paper" for the 1956 convention. This was titled "Filter Media." Forty-five members and guests attended this meeting at the Fox Steak House. After the usual opening of business with President Herb Kennedy presiding, the following old business was reported. At the recent Tri-State meeting, nineteen of Indianapolis Branch members reported as attending. Fred Anderson is senior member on the committee for the Indianapolis Tri-State meeting for 1957. A motion was made by Mr. Anderson that a branch representative be elected to serve on Tri-State committee. This was seconded by Ed Bruck and passed. Continuing with old business. Mr. Bruck reported that progress is being maintained as to the writing of the branch history. Bert Hawhee, general chairman for the annual dinner-dance and educational session reported everything is about ready. The following reported, also: Roman Bender on contributions, Hartwig on tickets. Mr. Anderson on education session, Mr. Bruck on evening entertainment, and Edna Rohrabaugh on favors.

The following new members were elected to the branch in a motion by Mr. Bruck and seconded by Abraham Max

Marvin Steuernagel, 2224 N. Auburn Ave., Indianapolis.

Fred Wm. Adams. 1515 Nichol Ave., Anderson. Ind.

Fred L. Meker, 535 N. Columbia St. Union City, Ind.

The motion was voted to accept by acclamation.

Dr. Max reported on the idea of a class in electroplating but, to date, not much has been decided.

The place for the 1957 Tri-State meeting, which will be in charge of the branch, caused much discussion. French Lick Springs Hotel at French Lick. Ind. or at the Claypool Hotel in Indianapolis seemed to be the two places most likely to result. This is to be decided at the May meeting and a suggestion that the board of managers decide was considered.

"Filter Media." a very timely and interesting paper in charge of a committee which has worked diligently for several months, was given as the program of the evening. Marshal Whitehurst, chairman of this committee, very aptly gave this with the help of Elmer Lundberg who read parts of it. This is to be given at Washington, D. C. in June by the members. After it was completed, the branch applaud-



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ed and showed its appreciation of the long hours of preparation. Much discussion followed. Mr. Whitehurst thanked the many who helped in this preparation and especially the committee. The meeting adjourned at 9:35 P.M.

Edna Rohrabaugh Secretary

#### Los Angeles Branch

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ed re re or or te Determined to go "all out" in efforts to obtain the 1960 Supreme Society convention for the West Coast, Los Angeles Branch, at its April 11 meeting, appointed a special convention committee which will devote the time remaining until the conclave opens in Washington, D. C., to a campaign for publicizing Los Angeles' application among the other branches.

The newly installed president, E. Truman Stoner, appointed Tony Stabile, to head the committee. The committee has several meetings scheduled with delegates Jack Bealle, Emmett Babcock and Stuart Krentel, and the branch officers, at which details of the campaign and the strategy to be

pursued before and at the convention was to be mapped.

Plans call for at least two mailings to all members of the A.E.S., the primary aim of which will be to dissipate any feeling of doubt that may remain that Los Angeles Branch, having once declined the convention after it was assigned, means business this time. A substantial convention expense fund was authorized.

Various members of Los Angeles Branch who transferred from eastern and mid-western branches during the past three or four years, reported that, in their opinion, sentiment among the membership as a whole is in favor of a Los Angeles convention, where eastern members can combine attendance at the A.E.S. sessions with a glorious vacation in sunny Southern California.

Los Angeles Branch's year-round membership drive terminated at the April meeting. Membership Chairman Stoner reported that 26 new members had been signed since September. 1955. This, he declared, represents a 9.5 per cent increase, and brought the membership total to 306. Frank Virgil, with four new members to his credit, was

awarded first prize in the form of a \$50 merchandise certificate. *Everett Elgin* (3 new members) received a \$25 certificate.

New members installed on April 11 included Glenn T. Sink. Douglas Aircraft Co.; M. L. Maroney, The Satter Co.; Jack W. Schultz, Jack W. Schultz Co.; and Phil Greathead, Square Deal Machine Co.

Applications were received from the following: Edward L. Riggs, Menasco Mfg. Co.; Milton Weiner, Hoffman Laboratories; Roy Webb, Oakite Products, Inc.; William A. Zube, Industrial Rack Co.; Anthony Palozo, Quality Hardware Co.; P. S. Perham, Whitman Gyro Co.; and David L. Angel, Delmar-Sheffield Co.

Earl Coffin presided for the 16th year in the role of master-of-ceremonies at the installation of new branch officers who were elected at the March meeting. New President Stone appointed Larry Henderson as sergeantat-arms, and Kenneth Johnson as chairman of the research committee.

Retiring President Earl Arnold was presented with a transistor portable radio in appreciation of his notable

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services to the branch during the past year. The presentation was made by Past-President Krentel.

The speaker at the educational ses-Sion was Henry Walker of Permalus. ter Co., a division of Allied Marketing & Research Co. He presented a talk on anodizing which he interpolated with some interesting comment on his former activity for the French government in the field of aluminizing.

#### **Detroit Branch**

The April meeting of the Detroit Branch was held in the Michigan Room of the Hotel Statler, April 6, 1956. Opening the meeting was a colored film on the planting and care of gardens. Lee Morse, now past president, formally opened the meeting by announcing that the annual Stag Day party would be held on July 28th at the Glen Oaks Country Club. Bob Trees of the Udylite Corporation, is chairman. The course in Electroplating, which was held during the month of March, was very successful and plans are under way to hold a more comprehensive course next year. Bert Lewis and Herb Head have prepared

a history of the Detroit Branch of the A.E.S. starting with the year 1917.

The Tellers Committee, headed by John Hitchcock, announced the results of the annual election.

President — H. J. McAleer, Formax Mfg. Co.

1st Vice-President — R. J. Racine, Wyandotte Chemicals Corp.

2nd Vice-President — G. Freidt, Jr., United Platers, Inc.

Secretary-Treasurer — E. J. Kubis, Wyandotte Chemicals Corp.

The new officers were installed by Herb Head, an old hand at this occupation. Howard McAleer accepted the reins of authority from Lee Morse and very graciously thanked the members for the honor.

Douglas Thomas then informed the members that the May meeting will be Sustaining Members Night of which C. D. Sparling will be technical chairman.

Dr. Gerald Kingsley, technical chairman of the evening, introduced the guest speaker, Charles Kimmel of the Magnesium Dept. of Dow Chemical Co. Mr. Kimmel's topic "How to Finish Magnesium" described chemical treatments, galvanic corrosion and some new developments in the field.

The meeting, attended by 180 members, was adjourned for refreshments at 9:30 p.m.

Patrick J. Driscoll

#### New York Branch

April 13th, 1956 was "Ladies Nite" at the New York Branch. Each year at this time, the branch extends an invitation to the wives and girl friends of the members to attend this open meeting. The turnout indicated that the ladies look forward to this event.

The meeting was called to order by the retiring President Albert Fusco. Since it had been scheduled that at this meeting the newly-elected officers were to be installed, Mr. Fusco immediately called on Franklyn J. Mac Stoker to preside for this function. Before the installation, however, Mr. Mac Stoker made the following presentations on behalf of the members of the N. Y. Branch:

To Albert Fusco - A "Past-President" pin and also a traveling bag.

To George Schore-A movie cam-

To Irving Goldwasser — A pen and pencil set.

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Next Mr. Mac Stoker introduced the new officers as follows:

Pres. — Derick Hartshorn.
1st V.P.—Geo. Herrmann.
2nd V.P.—Dr. Edward Saubestre.
Librarian—Joseph Rembecki.
Fin. Sec.—Relph Liguori.
Rec. Sec.—Anthony P. Briganti.
Sgt.-At-Arms—Jack Weiner.

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Albert Fusco now joins Mr. Mac Stoker and *Angelo Amatore* on the board of managers.

Mr. Hartshorn took over the chair and without ado introduced Mr. Mc-Donald a representative of the "Wine Institute of America." A brief talk by our speaker was followed by the showing of a film entitled "Growing Wine in America." When the film was concluded the floor was opened for questions

Anthony P. Briganti Recording Secretary

#### **Baltimore-Washington Branch**

More than 125 people attended a joint meeting on corrosion sponsored by the Baltimore-Washington Section of The American Electroplaters Society, The Electrochemical Society and The National Association of Corrosion Engineers held at The National Bureau of Standards on April 10.

The meeting was arranged to better acquaint the members of the three societies with each other and the activities of the other societies. The first part of the evening was used in explaining the corrosion activities of each society.

Wm. H. Metzger, of The National Bureau of Standards Electrodeposition Section, and president of The Baltimore - Washington Branch introduced Dr. Wm. Blum, retired Chief of The Electrodeposition Section and a consultant on electrodeposition, an honorary member of AES and ES and recipient of the ES 1944 Acheson Medal. He reported on the corrosion prevention research activities of the AES.

Fielding Ogburn, Assistant Chief of The NBS Electrodeposition Section and Chairman of The Washington-Baltimore Section of The Electrochemical Society introduced Dr. M. C. Bloom of The Naval Research Laboratory Corrosion Section. Dr. Bloom traced the history of the Corrosion Division of The ES and reported on its present day activities, including publication of The Corrosion Handbook. Ben J. Philibert, distribution scheduling manager, Plant Food Division, Olin-Mathieson Chem. Co. and chairman of the Baltimore Section of NACE introduced George Best, of The Mutual Chemical Div. of Allied Dye & Chem. Corp. and a director of NACE. Mr. Best reviewed the activities of the technical committees and the value of the corrosion abstracts published in Corrosion.

Ken Huston, Armco Steel Corp. Research Laboratories and program chairman then briefly reviewed Frank LaQue's impact on each of the societies

He was vice-president of NACE in 1947 and president in 1948. He was awarded the Whitney Medal in 1949 in recognition of achievement in the field of corrosion science.

His activities in The Electrochemical Society include chairman, membership committee; chairman, sustaining membership committee; business manager of *The Journal*; and chairman, editorial advisory board, *Corrosion Handbook*. Through his efforts and those of *R. M. Burns* and *H. H. Uhlig*, the *Corrosion Handbook* was edited and published.

His report as chairman of advisory committee on accelerated corrosion testing was responsible for the AES Research Committee establishing Project 15 with assignments to design, fabricate and service exposure of plated parts; to gather pertinent data on conditions thought to contribute to the deterioration of plated coatings; and to carry out exploratory accelerated corrosion tests.

He is also a member and active in the operation of many other technical societies; is a consultant on corrosion to many government agencies, and has authored numerous technical papers.

Mr. LaQue delivered his talk on the subject "Planning and Interpretation of Corrosion Tests" in his characteristic forceful, yet entertaining manner. It concerned accelerated and long time tests carried out to choose suitable corrosion resistant material for industrial applications. Special attention will be given to details that must be considered in designing and interpreting corrosion tests, to take into account such peculiar forms of corrosion as pitting, crevice corrosion, effects of heat treatment, effects of stress, galvanic action, effects of velocity and heating and cooling effects. The talk was illustrated by many slides related to appropriate data and test methods.

Ken Huston

#### Chicago Branch

The Chicago Branch held its Annual Ladies Night meeting and installation of officers on Friday, April 13, 1956. The meeting was held, as it was last year, at Algauer's Fireside Restaurant. Apparently all of the superstitions about Friday the 13th did not keep the majority of the members from

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The first, and more serious portion of the evening was devoted to a report by *Paul Glab*. Northwestern Plating Works, on the activities of the past year. Officers for the coming year were then installed.

Attention was then turned to the business of having a good time. The first item of this "business" was the drawing for the door prizes for the ladies. The winners were Mrs. Colzel, Mrs. De Looth, Mrs. Hay and Mrs. Andrus,

The final portion of the evening was devoted to 3-D slide series entitled: The Not So Wild and Wooly West. The series was prepared by *Al Dodds* and *Doug Hewes* of Western Electric.

We want to wish all possible good luck to *Dick Connors* in his new assignment with Cowles . . . *Norm Garman*, who for many years represented Cowles in the Chicago Area is wished the best of luck. A different kind of good luck is wished to *Berny Gagnon*, formerly of Chicago, now operating Gagnon Plating in Colorado Springs, Col. We understand Berny had a fire

and we hope he comes back full force. In the past Rudy Hazucha, a work horse for the Branch, has been listed as the outstanding bowler in the Chicago Branch. Roy Hoegh, of Mercil Plating Equipment, is in a team which has won many honors and made television. Looks like Rudy had better watch his laurels. Chicago Branch is really getting to be a Female Society. We hear that Joan Wiarda, of METAL FINISHING, will now be a member of The Chicago Branch, transferring from the East. She with Eileen Drews and Irene Modjeska, give us a trio of the fair sex as active members. Bill Sticksel. formerly with Udylite is now in the plating business in Aurora. . . . Good Luck Bill!

Jerome Kuderna

#### AMERICAN ZINC INSTITUTE

At the annual meeting of the board of directors, F. S. Mulock was re-elected president of the American Zinc Institute for a second term. Mr. Mulock is president of the U. S. Smelting Refining & Mining Co., Boston, Mass.

were three vice-presidents: C. Merrill Chapin, Jr., St. Joseph Lead Co., New York City; R. G. Kenly, The New Jersey Zinc Co., New York City and E. H. Snyder, Combined Metals Reduction Co., Salt Lake City, Utah. Erle V. Daveler, American Zinc, Lead & Smelting Co., New York City, continues as treasurer and John L. Kimberley was re-elected executive vice-president and secretary.

#### Porcelain Enamel Institute

Donald L. Benson has joined the staff of the Porcelain Enamel Institute. Mr. Benson, who lives in Hyattsville, Maryland, recently graduated from the University of Maryland where he re-

ceived a B.S. Degree in Public Relations. Mr. Benson will assist William N. Brinker, market development man ager, in the public relations, advertising, and sales promotion activities of the Institute.

The Institute is the trade association for the porcelain enameling industry with headquarters in Washington, D. C.

#### OBITUARY

#### T. J. PETERSON

T. J. Pesterson, 82, president of Tamms Industries. Inc., Chicago, died Friday May 4th at his home in Evanston, Ill. after an illness of two years. Mr. Peterson established the firm, formerly known as Tamms Silica Co., in 1911 and has headed the company in its succeeding 45 years of growth and expansion.

Mr. Peterson was a member of St. Luke's Church in Evanston, also of the Chicago Athletic Association and Exmoor Country Club. He is survived by his wife Marion and a daughter, Helen, of Los Angeles.

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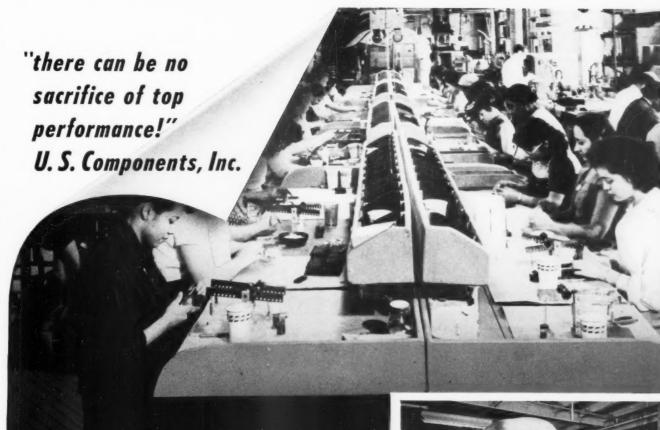
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